

# MAINE'S TRANSPORTATION SYSTEM

Status and Trend Indicators of Economic Growth and Quality of Life

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Maine Department  
of Transportation

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## **Introduction**

The exchange of goods and services that make up what we call “the Maine economy” would simply not be possible without our transportation system. Economic activity depends enormously on our roads, railways, cargo ships, and aircraft. It is via these transportation modes that Maine people connect with each other and with the rest of the world.

The quality and accessibility of Maine’s transportation systems have a huge impact on Maine’s prospects for economic growth. This report provides a summary description of Maine’s transportation system and tells how this system contributes to the economy. It also profiles those key issues that serve as indicators of the vitality of the system.

## **Maine’s Transportation System**

### **System Overview**

The largest and most important component of Maine’s transportation system is its highway network. The overwhelming majority of people and goods in Maine are moved over the state’s 22,670 miles of public roads, and the highway system consumes the vast majority of transportation expenditures. The Maine Department of Transportation is responsible for approximately 8,328 miles, or 37% of the system. The Maine Turnpike Authority is responsible for the 111-mile Turnpike. In addition, 336 miles of state highways are maintained by other government agencies. The remaining 13,895 miles, or 61% of public roads in Maine are the responsibility of local government. These roads carry 12% of the total traffic. In addition to our public roads, there is a very large network of private roads in Maine including camp roads and roads owned by paper companies.

Currently, Maine’s transportation system is used by millions of people who generate approximately 14 billion vehicle miles of travel (VMT) per year. With an average of 1.4 persons per vehicle, this translates to about 20 billion person-miles of travel (PMT). Over the next 20 years, highway travel in Maine is expected to grow by more than 18%.

Our highway system includes 2,962 bridges and minor spans that the State of Maine now has total or partial responsibility for as a result of legislative changes made in 2001. This number does not include bridges used exclusively for rail or pedestrian traffic, or structures owned by the Maine Turnpike Authority, federal agencies, or private entities.

Maine’s aviation system consists of 35 publicly owned airports, six of which are served by regularly scheduled passenger service. In 2000, a total of 1.9 million passengers (enplanement and deplanement) used these commercial services into or out of Maine. This number is projected to increase to nearly 3 million by 2005.

The Maine State Ferry Service provides transportation to Islesboro, North Haven, Vinalhaven, Swan’s Island, Matinicus and Frenchboro. The system is owned, operated, and subsidized by the State of Maine and provides year-round service. In 2000, the Maine State Ferry Service carried

472,552 passengers. In addition, the Maine Department of Transportation works closely with the Portland-based Casco Bay Island Transit District (CBITD) and the towns of Cumberland and Yarmouth to provide access from the Casco Bay islands to the mainland. In 2000, CBITD ferries carried 916,231 passengers. Also, numerous private operators provide seasonal or year-round transportation to other island communities.

Maine's three busiest cargo ports of Eastport, Searsport, and Portland have shown steady, consistent growth for the past twenty years. In 1999, about 1.3 million short tons of dry cargo were moved through these ports. In addition, Rockland and Winterport also serve as valuable cargo ports.

In December of 2001, Amtrak passenger rail service from Portland to Boston began, providing another alternative for travelers to and from Maine. This service is expected to attract a growing number of day visitors to the state.

The State of Maine is also served by seven private railroads operating nearly 1,200 miles of track that traverses most metropolitan areas and many rural areas of the state. In 1999, approximately 4.4 million tons of products left Maine by rail while about 4 million tons came into the state.

In recent years, truck/rail intermodal facilities have been constructed in Auburn and Waterville to serve Midwestern and Canadian markets for Maine businesses. Presque Isle has also added a site for intermodal traffic. These three facilities are growing and currently move about 15,000-20,000 truck units per year.

An important part of Maine's freight transportation system is the network of pipelines. A 500-mile network of natural gas pipelines has been constructed. There are two lines, one running from outside of Montreal to Westbrook, and the other from Nova Scotia, entering at Calais and also running to Westbrook. Maine also has two major petroleum pipelines, one from Montreal to Portland and the other from Searsport to Bangor.

## **Contribution to the Economy**

It is easy to take for granted the ways in which Maine's transportation system contributes to the economy. It's similar to the way that a company's telephone contributes to its ability to do business. Although the company can't define the exact dollar amount of its business that results from having a telephone, it can't do business without it. Even though the telephone's contribution is largely indirect, it is absolutely essential.

This report presents information that *indicates* many of the indirect impacts of Maine's transportation system. For each indicator, we have provided a brief description of how it impacts the economy, even if specific dollar values are not referenced. Taken as a whole, the indirect impacts form a complex picture from which multiple conclusions may be drawn.

In terms of direct economic impacts, the U.S. Department of Transportation estimates that about 10.7% of gross domestic product (the value of all goods and services exchanged in the economy) can be attributed to transportation. This includes the value of all goods and services purchased for

transportation services plus business investments for transportation services. This estimate applied to Maine suggests that about \$3.4 billion worth of annual economic activity in Maine is attributed to transportation.

Based on U.S. Department of Labor consumer spending data, it is estimated that the average American household uses almost 19% of its annual spending on transportation-related goods and services (just over \$7,000). About 42% of household transportation spending goes to vehicle purchase, 35% to vehicle maintenance, insurance, financing, and related, and 17% goes to gasoline and motor oil. Just 6% goes to non-vehicle related items such as purchases of transportation services including taxis, and tickets for airlines, buses, and trains.

Overall, almost 15,000 people are employed in Maine's transportation industry. This number, which amounts to about 2% of the labor force, includes those employed in moving goods by truck, air, rail, water, buses, and taxis. Nationally, about 3.5% of the labor force is employed in the transportation industry.

In addition, there are many more people employed in jobs related to transportation, such as manufacturing motor vehicles, aircraft, ships, trains, tires and other such goods; sales and service of automobiles and auto parts; construction of transportation infrastructure; and employees of transportation-related government agencies.

Based on analysis conducted by the Federal Bureau of Transportation Statistics and our own analysis based on data from the Maine Department of Labor, it appears that a smaller percentage of Maine's labor force is employed in transportation-related industries than for the U.S. as a whole. This leads us to conclude that more of our transportation needs are being served by out-of-state companies, relative to other states. This is due in large part to our geographic location relative to other states and the fact that we have no major transportation hubs.

<b>Employment in Transportation Related Jobs - Maine, 1998</b>		
<b>Industry</b>	<b>Jobs</b>	<b>Percent</b>
Transport Industry (movement of goods)	14,799	2.3%
Transportation Equipment Manufacture	11,275	1.7%
Auto Sales, Service, Parts, and Related	17,583	2.7%
Trans. Infrastructure Construction*	13,233	2.0%
Total Transport-Related	56,890	8.7%
Maine Labor Force	649,636	100%

\* All data from Maine Dept. Of Labor except construction jobs estimate, which is from a 1999 report by the American Road and Transportation Builders Association that was based on 1997 data.

## Maine's Unique Transportation Challenges

Constructing and maintaining a system to move people and goods around Maine is more challenging than in many other states for several reasons. First, Maine has a sparse population relative to our land area. With a density of just 41 residents per square mile, Maine ranks 38th among the states in terms of density, and it is the least dense of all the six New England states. This is the leading reason why public transportation is not prominent in Maine and why the cost of constructing and maintaining highway infrastructure is relatively high per resident.

Another reason for relatively high per-resident costs is that Maine has an enormous number of visitors each year relative to its resident population. Transportation infrastructure must be built and maintained to support summer's peak population and system use.

Related to density, Maine has more miles of road per person than any other New England state, and this is not reflected in federal funding for our highways. Of the six New England states, Maine received the least money per federal-aid centerline mile of road in 1999. Maine received only \$23,000, compared to the New England average of \$52,000.

Three trends about the nature of our population that will continue to impact our transportation system are worth noting:

- Maine people are more reliant on cars than they used to be. While Maine's population has grown about 13% since 1980, the number of registered vehicles has grown by 48%.
- Maine's population is aging. In 1970, 12% of the population was 65 and older. Currently, 14% of Maine people are 65 and older. By 2020, it is estimated that almost 20% of Maine people will be 65 and older. This trend presents ever increasing challenges to provide public transportation and adapt highway design and traffic control devices to be increasingly sensitive to a driving population with somewhat diminished physical capabilities.
- Maine people are moving out of the urban centers and into rural areas. In 1960, 60% of Maine people lived in service center communities, whereas today just 44% of the population lives in these communities. This trend puts a substantially increased burden on rural roads to carry traffic to and from the urban centers.

Maine's geophysical characteristics also pose transportation challenges. The Maine coast is more than 3,000 miles long, and people want to be able to access a good deal of it by road. To the west, mountains and lakes stand in the way of direct travel and increase construction costs of roads and railways.

Another challenge, relative to southern states, is Maine's weather. A significant amount of money is spent annually on snow removal, and the construction and maintenance of roads and railways needs to account for deep frost depths. The operation of Maine's airports and seaports is also seriously impacted by Maine's winter weather.

Lastly, it is worth noting that Maine people care deeply about preserving the natural environment. While we like to be independent, we are deeply concerned that transportation infrastructure doesn't unreasonably harm our water quality, wildlife habitats, and other environmental amenities. Maine's transportation planners are challenged to strike the balance between minimizing environmental impact yet providing mobility for independent-minded people.

## **Funding for Transportation**

The principal sources of funds for public spending on transportation in Maine are the state's Dedicated Highway Fund and the federal government. Funds for these sources are derived from the proceeds of motor fuel taxes, motor vehicle registration and license fees and other transportation user fees.

Over the long term, the Highway Fund has continued to lose ground. When adjusted for inflation, transportation funding has increased only slightly the past 12 years, while state government allocations from the General Fund have generally grown. In 1975, over 25% of total state revenues were derived from the Highway Fund. Today, the Highway Fund represents about 10% of total State revenue. While transportation program expenditures are increasing at a rate of 3% a year, revenues are increasing at a rate of only 1% a year. In April 2002, the Maine Legislature enacted a law that ties gasoline and diesel-fuel taxes to the U.S. Consumer Price Index, a measure that will provide some stability, but still leave the Highway Fund well short of the money needed to maintain Maine's transportation program at its current level.

Also at issue is the sustainability of transportation improvement funding. Over the past eight years, gains in Maine's transportation improvement program have been realized as a result of one-time revenues that came principally from Maine's General Fund. Given the current state of the General Fund, future infusions are unlikely. Worse yet, renewed pressure to fund General Fund needs from the Highway Fund may resurface, as it has in the past.

Bond financing has long been an important source of funding in expanding the Department's capital program. Highway Fund borrowing has recently averaged \$41 million per biennium, however, resulting in a debt-to-revenue ratio about triple that of the General Fund. This increase in the debt level has been necessitated by an increasing need for transportation investments with a relatively flat revenue stream. Recent actions by the Maine Legislature to reduce Highway Fund debt through General Fund borrowing will help MaineDOT achieve its goal to reduce its debt to the state government-wide goal of 5% of revenues.

Given its current financial condition, MaineDOT understands it must continue to strive to increase production without significant new staff through local administration of projects, design-build concepts, process reductions, utilization of technology, and similar innovations. As a direct result of ongoing cost-cutting efforts, MaineDOT spends less on administration per mile of highway than any other state in the nation according to a recent study by David Hartgen of the University of North Carolina at Charlotte.

Apart from state and federal funding, municipalities build and maintain local roads that comprise about 61% of Maine's public roads and carry about 12% of total traffic. Construction and maintenance of these roads is supported in large part by locally collected property taxes. An analysis of data collected via Maine Municipal Association's 1998 local government fiscal survey suggests that Maine municipalities spent over \$100 million on local roads in 1998.

In David Hartgen's study mentioned above, he analyzed the 50 states in terms of how much they spend on transportation improvements and maintenance relative to how well their transportation systems perform. Performance is assessed by looking at pavement condition, bridge condition, urban Interstate congestion, fatal crash rates, and lane widths on rural roads. By this analysis, Maine ranks 12th among all 50 states and 1st among New England states in terms of system performance per dollar spent. This finding suggests that Maine improves and maintains its roads to a higher standard with less money than most states.

# Report Purpose, Organization, and Process

## Purpose of this Report

This report was prepared to serve as an objective statement about the status and trends of key aspects of Maine's transportation system. It is not intended as a commentary on the effectiveness of the Maine Department of Transportation or as a case statement for increased transportation funding. The first edition of this report was prepared in joint effort by the Maine Development Foundation and the Maine Department of Transportation as an objective statement about various issues. This two-year update was prepared by the Systems Management Division of MaineDOT's Bureau of Planning. As with the first edition, it invites readers to draw their own conclusions.

This report does not tell the whole story about Maine's transportation system – doing so would take volumes. Rather, it attempts to condense what would otherwise be volumes into a very concise statement. It presents “indicators” – snippets of data that give us a good indication of the larger picture. As the weather forecaster's symbols convey a very complex dynamic happening outside, or as a car's dashboard gauges convey the most critical information about the complex happenings under the hood, this report represents Maine's incredibly complex transportation system via a short list of indicators. While the report doesn't tell the entire story, it tells the story in a way that is easily accessible and understandable to a wide and varied audience. As we are able to examine a longer trend for each of these indicators, the value of this effort will increase.

This report profiles a wide variety of issues in a single reference document. It may be used by legislators, state and federal agency managers, business leaders, municipal officials, and others as a source of information that will help them deal with a wide variety of policy decisions. It may also be used by the media and the general public as a summary of where Maine stands on key transportation issues. Because transportation issues affect land use policy, environmental policy, energy policy, tax policy and a range of other issues, we think the findings of this report have very broad application.

## How the Report Is Organized

This report's focus is on a framework of 22 indicators organized into four categories: System Use, Impact on Economy, Impact on Quality of Life, and Infrastructure. The *System Use* indicators tell us about how and how much our transportation system is being used and how that use is changing. The *Impact on Economy* and *Impact on Quality of Life* sections address those components of the transportation system that most impact our economy and quality of life. Generally, these are outcome measures. The *Infrastructure* section is a collection of indicators that tell us about the current and changing condition of the system's major infrastructure components.

For each indicator, we have provided a simple graph with some textual explanation, a statement about how the issue impacts the economy, a statement about where the trend is headed into the future and the key factors that will affect the trend. In some cases, a second graph and explanation of related data are included. The related graph and data are not to be confused with the indicator itself, they merely try to provide a little more information about the issue at hand.

## Relation of this Report to Others

A leading inspiration for the style of this report was *Measures of Growth*, the annual report of the Maine Economic Growth Council. *Measures of Growth* showcases 60 indicators that summarize the Maine economy, much like this report showcases a short list of indicators that, as a whole, tell us about Maine's transportation system. *Measures of Growth* is mandated by state statute and has now been published annually for the past five years. Legislators, state agency managers, business leaders, non-profit leaders, and education leaders have come to rely on it as the definitive annual statement on the Maine economy. It is expected that this report on Maine's transportation system will be used in a similar manner.

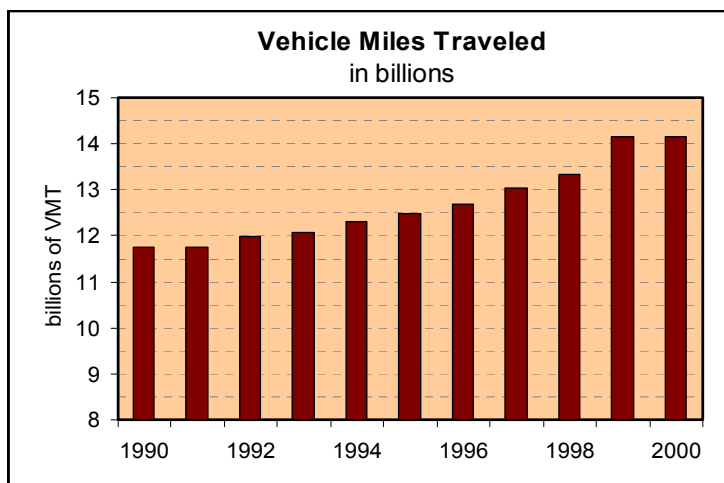
This report does not set forth goals or targets for the indicators but there are other important transportation reports that do contain goals and targets related to these indicators. Appendix C provides a summary of related reports.

## 1 - Vehicle Miles Traveled

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### Vehicle Miles Traveled Continue Steady Increase

Vehicle miles traveled (VMT) is the single most important indicator of overall demand on Maine's transportation system and, as the graph indicates, demand is increasing at a steady pace. In 2000, vehicles traveled an estimated 14.2 billion miles on Maine roads, a 20% increase over the 11.8 billion miles of road traveled in 1990.



### Impact on the Economy

As the Maine economy grows, so does the number of VMT over Maine roads. Increased movement of goods and people over Maine roadways has a positive impact on the economy, and economic growth results in increased activity on Maine roads. It is an extremely close relationship, and causal in both directions.

For instance, throughout most of the 1990s, Maine experienced steady growth in VMT (as shown in the graph) just as the overall Maine economy experienced growth during those years. VMT growth slowed from 1999 to 2000, just as the economy started to slow.

Increased economic activity is not entirely responsible for all the recent growth in VMT, however. Another major impact on this growth has been the general geographic dispersion of our population. Over the past ten years, more people are living in rural areas, farther away from each other and from their jobs and community services.

### Outlook

Over the next 20 years, it is estimated that VMT will grow more than 18% to about 17 billion by 2020. The actual growth in VMT will be influenced by rates of overall economic growth, the extent to which people and freight use alternative modes, the ability of Maine roadways to accommodate traffic growth, and the cost of operating vehicles (which will be influenced by fuel costs and related taxes).

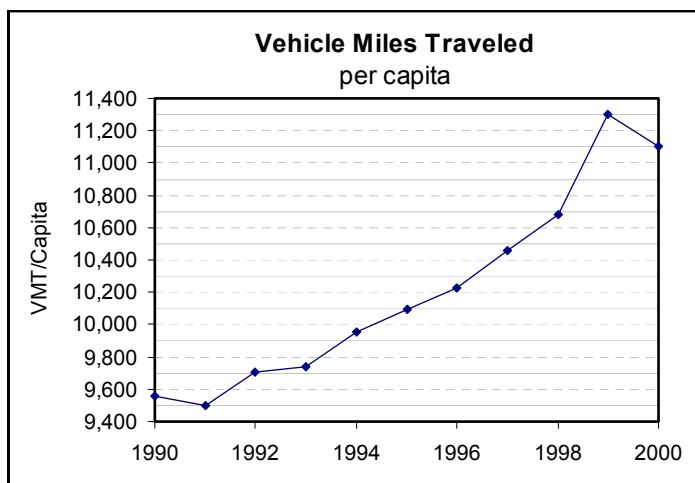
## 1 - Vehicle Miles Traveled (continued)

### Related Data and Issues

Maine people are driving more than ever (in large part because of shifts in residence from urban centers to rural settings), more people are visiting Maine by vehicle, and freight transporters are increasingly using motor carriers. The result is that traffic on Maine roads has increased at a significantly faster pace than has the population of Maine people.

While Maine's population has grown 4% over the past 10 years, VMT has grown 20%, resulting in a 16% growth in VMT/capita as shown in the graph to the right.

More than 60% of Maine's VMT is carried on the interstate and other arterial highways, which together constitute approximately 12% of all the state's road mileage.



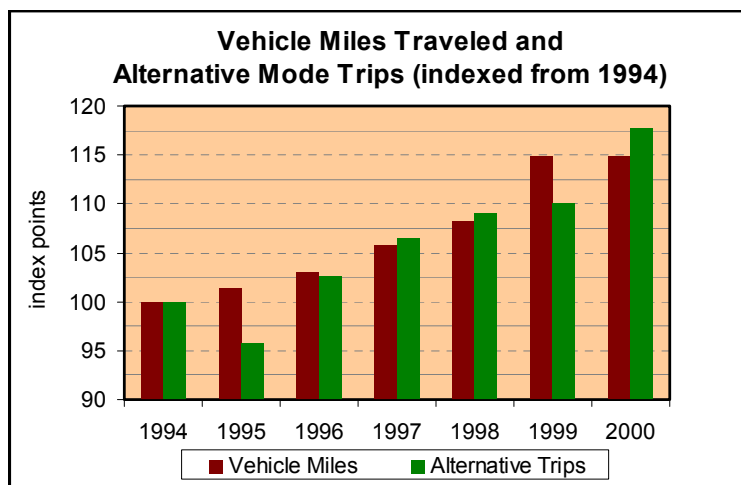
### Data Source

Maine Department of Transportation, Bureau of Planning, Systems Management Division.

## 2 - Passenger Travel by Mode

### Recent Increase in Alternative Mode Travel

From 1994 to 2000, the number of trips made by fixed route buses, ferries, and airplanes (collectively known as alternative modes) increased by 20% while the number of vehicle miles traveled grew by 15%. In order to compare these two trends, the data in the graph to the right is presented in indexed format such that the value of each mode in 1994 is indexed to equal 100 points.



In 2000, fixed route buses, ferries, and airplanes made an estimated 6.4 million trips in Maine, up from 5.4 million trips in 1994. Over the same time period, vehicle travel increased from 12.3 billion vehicle miles traveled in 1994 to 14.2 billion vehicle miles traveled in 2000.

### Impact on the Economy

People traveling by any mode generally have a positive impact on the economy because they represent the movement of goods and services. However, we are increasingly aware that travel by modes other than low occupancy private automobiles can be environmentally beneficial and, at the same time, benefit the economy because it reflects the existence of competitive choices.

### Outlook

The state has embarked on a *Strategic Passenger Transportation Plan*, also known as *Explore Maine*, which seeks to bring increasing numbers of tourists into Maine by rail, cruise ship and airplane. The plan is in keeping with Maine traditions of following maritime routes of steamship lines and making excursions to the Maine woods. The plan conservatively projects that the system will attract 87,000 new visitors to Maine annually, with a direct economic benefit of \$48 million per year. This benefit increases to \$121 million per year when indirect spending is included. The plan also projects the creation of more than 1,400 new, full-time jobs.

Visitors entering Maine from southern New England now have the option of doing so by rail, as Amtrak passenger rail service from Portland to Boston began in December 2001. This service is expected to attract a growing number of day visitors to the state.

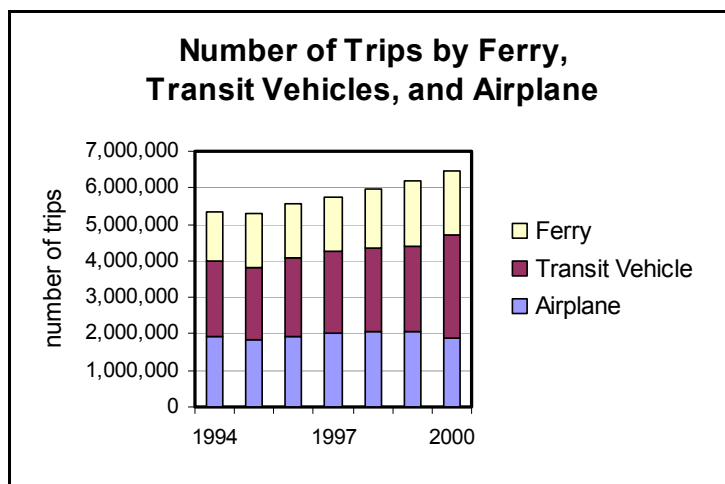
## 2 - Passenger Travel by Mode (continued)

People traveling from place to place within Maine are also increasingly using alternative modes. A stellar performer for the past three years has been the free National Park Bus System in Acadia National Park. Seventeen propane powered Island Explorer buses carried 239,971 riders; thus reducing traffic congestion and air pollution. This is an inspiring model for future transit development.

### Related Data and Issues

The graph to the right shows a historical breakdown of the use of alternative modes. Over the past six years, ferry ridership has increased by 28%, air travel has decreased by 2%, and travel on fixed route buses has increased by 37%.

Both this graph and the previous one reflect the successful and growing private interstate bus service that links Maine communities to one another and with out-of-state destinations. These graphs also indicate the growth in ferry ridership experienced since the introduction of high speed ferry service between Bar Harbor and Nova Scotia in 1998.



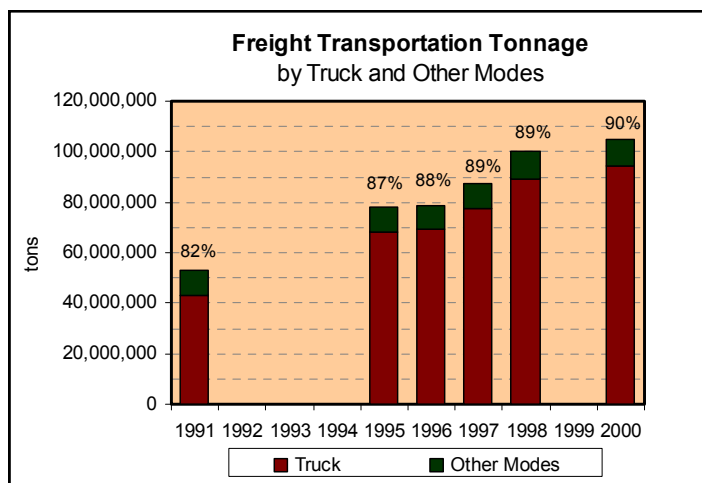
### Data Source

Maine Department of Transportation, Office of Passenger Transportation.

### 3 - Freight Transport by Mode

#### Trucked Freight on the Increase

In 2000, approximately 90% of all manufacturing freight tonnage transported in Maine was via truck, while just 10% was shipped by rail, water, or air. Overall, the amount of manufacturing freight shipped in Maine increased 99% from 1991 to 2000, and trucks are increasingly the preferred mode.



The decentralization of freight delivery and inventory control systems have contributed to the increased dominance of motor carriers in the movement of freight in Maine. The deregulation of the trucking industry has also increased the percentage of freight moved by truck. These increases have occurred at the expense of railroads.

#### Impact on the Economy

Overall increases in the amount of freight shipped bodes well for the economy although the increased reliance on trucking relative to other modes raises some economic concerns. For instance, an increase in heavy truck traffic on our highways and bridges has necessarily increased the rate of pavement consumption and bridge stress, particularly on older local and secondary highway systems. This use translates to increased highway and bridge funding needs. It also impacts the increasing traffic congestion on our major highway corridors, such as the Maine Turnpike, and impacts highway safety in terms of large vehicle interaction with automobiles.

#### Outlook

The historical trend suggests that increased reliance on trucking may continue. By creating more choices for Maine companies to ship their goods, however, it is believed that shipping costs will come down, and thus make Maine a better place to do business.

#### Related Data and Issues

In 2000, about 10% of manufactured freight in Maine was shipped by modes other than truck. About 6% was shipped by rail and 4% went by water. Less than .01% was shipped by air.

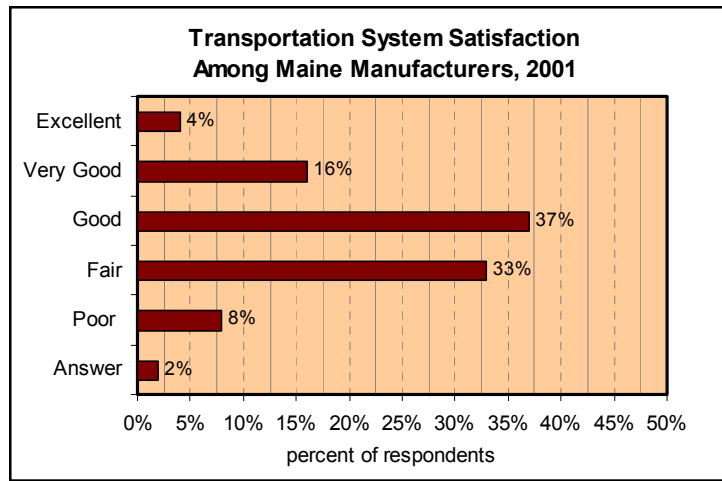
#### Data Source

Maine Department of Transportation, Office of Freight Transportation.

## 4 - Satisfaction Among Manufacturers

### Manufacturers Moderately Satisfied with Transportation System

About 20% of a representative sample of all Maine manufacturers believes that Maine's transportation system is very good or excellent. They were asked, "How would you rate Maine's transportation system for meeting your business needs?" About 8% responded that the system is doing a poor job of meeting their needs.



### Impact on the Economy

Manufacturing is heavily reliant on transportation for bringing in raw materials and shipping out finished products. The satisfaction of this class of businesses with the transportation system is an important indication of how effectively the system is supporting economic activity.

### Related Data and Issues

When asked how much they agreed or disagreed that certain improvements to Maine's transportation system would help their business, 52% strongly agreed that better roads would help. About 19% strongly agreed that better air passenger service would be helpful, while 17% strongly agreed that better rail service would be helpful.

Although most manufacturers rely on the transportation system to ship freight, 10% said that movement of customers and/or employees within Maine was more critical to their business than freight transportation.

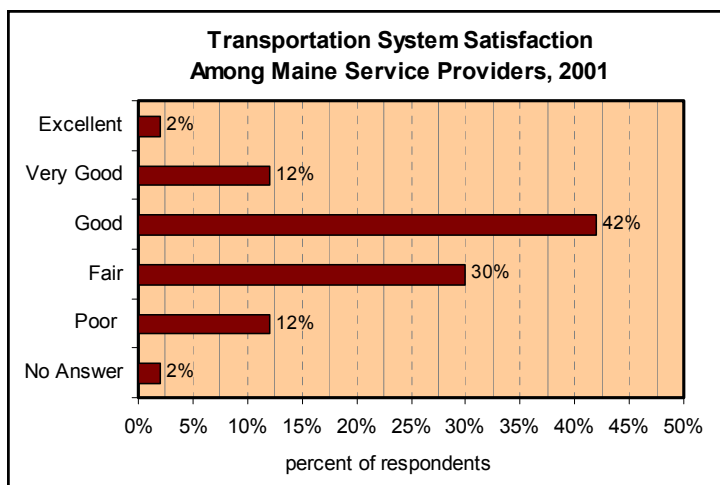
### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

## 5 - Satisfaction Among Service Providers

### Service Providers Moderately Satisfied with Transportation System

About 56% of Maine businesses that are service providers say that Maine's transportation system is doing a good, very good, or excellent job of meeting their business needs. A statewide representative sample of service providers was asked, "How would you rate Maine's transportation system for meeting your business needs?" About 42% responded that the system is doing only a fair or poor job, down from 57% in 1999.



### Impact on the Economy

The service sector is growing in Maine relative to manufacturing and many growing service industries rely heavily on the ability to move their employees and business partners to and from their facilities. Proximity to a major airport, for instance, is often cited as quite important to site location decisions of service companies.

### Related Data and Issues

Non-manufacturing companies across Maine were asked: "Which of the following aspects of transportation is most critical to the success of your business?" About 43% responded "Movement of customers and/or employees within Maine." About 32% responded "Movement of freight via road, air, rail, or water." And 24% responded "Movement of customers and/or employees in and out of Maine."

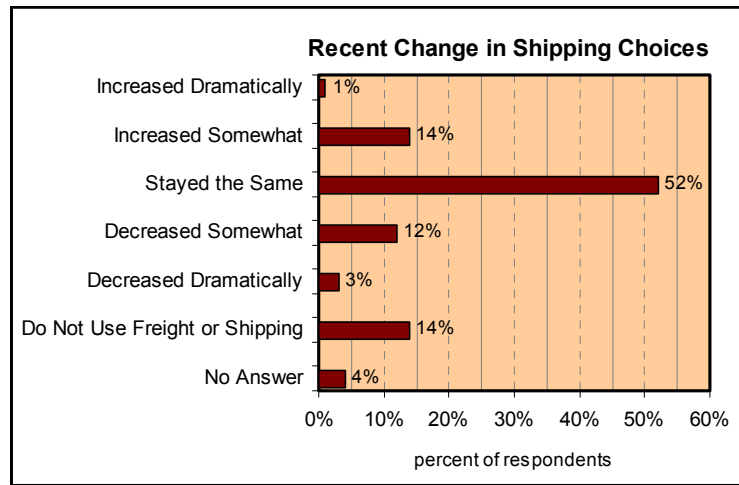
### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

## 6 - Freight Transport Competitiveness

### Competitiveness Appears to be Remaining Constant

Given that price competitiveness is driven by the number of alternative choices that shippers have, Maine businesses were asked the extent to which their shipping choices have changed over the past three years. The graph to the right shows that about the same percentage of businesses have reported an increase in shipping choices as those that have reported a decrease.



### Impact on the Economy

For some businesses, the cost of freight shipping (raw materials in and/or finished products out) is a substantial component of the cost of doing business. Maine's economic growth is, thus, somewhat dependant on the cost of shipping freight in this state relative to others. While a direct cost comparison is not currently available, we are able to look at cost trends within Maine by tracking the number of choices available to shippers. An increasing number of choices bodes well for economic growth.

### Related Data and Issues

When asked, "Which of the following aspects of transportation is most critical to the success of your business?" 51% of Maine businesses said "movement of freight via road, air, rail, or water."

### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

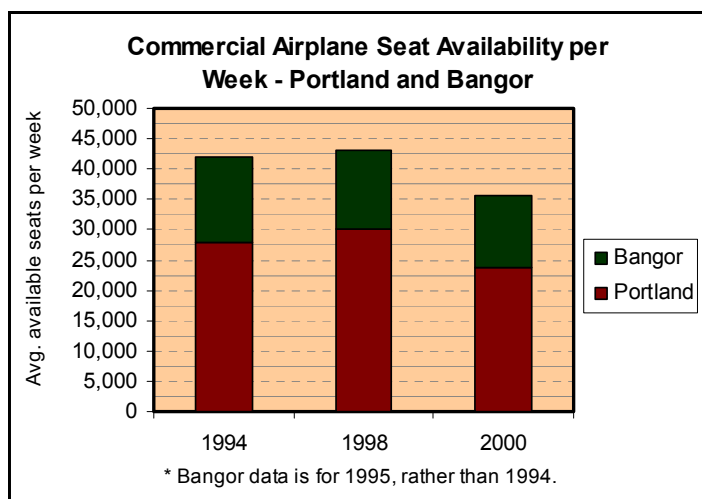
## 7 - Air Travel Competitiveness

### Air Travel Competitiveness of Major Maine Airports Improving

In 2000, an average of 35,658 commercial airline seats departed each week from Maine's major airports: Portland International Jetport and Bangor International Airport. This number represents about an 18% decrease in seat availability over 1998 levels.

From 1998 to 2000, seat availability from Portland International Jetport decreased by about 22% while seat availability from Bangor International Airport decreased by about 8%.

Seat availability is a good proxy for cost competitiveness because greater freedom to choose when one will fly correlates with more competition and resulting competitive prices.



### Impact on the Economy

Available and competitively priced air travel contributes to economic growth in two important ways: it impacts the cost and ease of doing business with out-of-state interests, and it has a direct bearing on the extent to which tourists visit Maine via air. A 1999 study finds that air travel is the most predominant mode of travel among overnight business visitors to Maine. It was estimated in 1994 that 11.4% of Maine's employment was tied to the availability of commercial air service.

### Outlook

The importance of air service will increase as Maine's economy continues to evolve from manufacturing to tourism and other service industries. Historically, tourism and service industries use air service at significantly higher levels than manufacturing industries.

### Related Data and Issues

The mix of jet service and turboprop service at Maine airports is important because higher levels of jet service indicate more direct flights to desired destinations and more comfortable air travel. At Portland, the ratio of jet service to turboprop service has increased 5% over the past few years with jet service accounting for 73% of all service. At Bangor, jet service has increased from 18% of all service in 1998 to 29% in 2001.

## **7 - Air Travel Competitiveness (continued)**

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Also important are the number and geographic distribution of Maine airports with regularly scheduled commercial air service. Currently, there are six such airports in Maine: Portland International, Bangor International, Augusta, Knox County, Hancock - Bar Harbor, and Northern Maine Regional. This number has declined over the past several years with the loss of regularly scheduled commercial air service from Lewiston-Auburn, Frenchville, and Waterville.

### **Data Source**

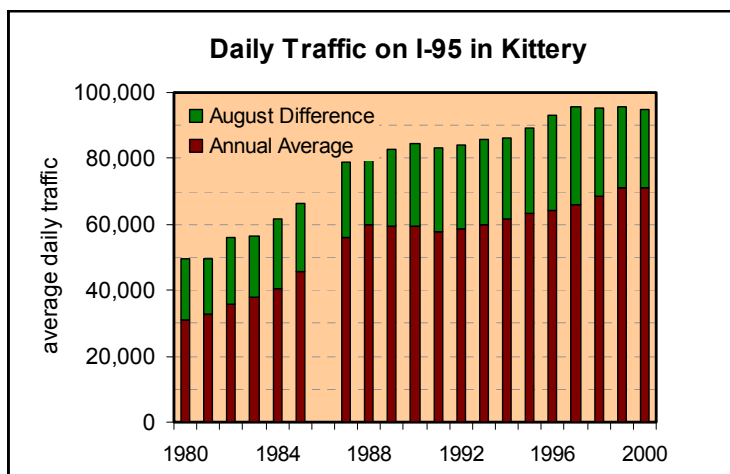
Maine Department of Transportation, Office of Passenger Transportation.

## 8 - Tourism & Seasonal Highway Use

### Traffic in Kittery Shows Tourism on the Increase

Long-term trends at the permanent traffic counting station on I-95 in Kittery, the major travel and tourism gateway into Maine, indicate a steady growth in Maine tourism as well as general traffic.

Between 1980 and 2000, average daily traffic in August (typically, the highest traffic month of the year) has increased from 50,000 to 95,000 vehicles per day, a 90% increase. The difference between August and year-round traffic volumes has also grown, from 19,000 to 24,000 vehicles per day, reflecting a 26% increase in traffic attributable to tourists over the past 20 years.



On a year-round basis over the same 20 years, average daily traffic has increased from 31,000 to 71,000, nearly a 130% increase. The higher percentage growth rate in year-round traffic suggests that the tourist season has been expanding beyond the traditional summer season into the spring, fall, and winter. As a result of this expansion of the tourist season, the available highway system capacity is being utilized more evenly over the whole year.

### Impact on the Economy

In 2000, tourism related expenditures in Maine totaled \$5.4 billion dollars. About \$700 million of that amount was spent on hotels and other lodging establishments. It is estimated that non-resident visitors to Maine directly and indirectly generated \$8.8 billion in sales of goods and services, over 116,000 jobs, and \$2.5 billion in total payroll.

### Outlook

If past trends continue, we can expect tourism to increase not only in the summer, but also in the spring, fall, and winter. This increase will continue the trend toward greater use of the transportation system and a more even distribution of that use throughout the year. Peak season use of the system is likely to continue growing, however. Seasonal transportation services geared toward tourism can be an effective way of accommodating peak season demands and relieving some of the pressure for additional highway capacity.

## **8 - Tourism & Seasonal Highway Use (continued)**

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### **Related Data and Issues**

A survey of Turnpike travelers in August, 1998 found that 19% of all travelers were either beginning or completing a vacation to Maine.

In 2000, approximately 90% of all tourists visiting Maine arrived by private motor vehicle. About 4% arrived by ferry or boat, 4% by bus, and 3% by plane. None arrived by rail at the time of this writing, although Amtrak passenger rail service from Portland to Boston began in December 2001.

Day and overnight visits to Maine grew from 39.2 million in 1999 to 44.0 million in 2000, a 12% increase. Day trips accounted for 79% of visitor trips to Maine in 1997 and 80% in 2000. The importance of day visitors should not be overlooked because Amtrak passenger rail service from Boston is expected to attract a growing number of day visitors to the state.

### **Data Source**

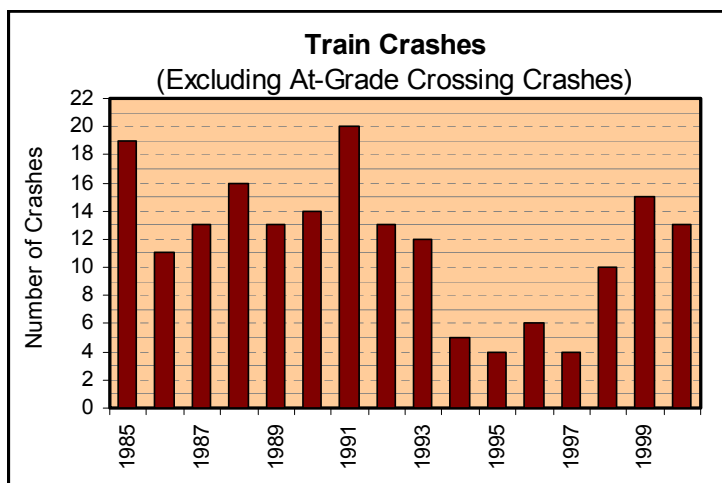
Maine Department of Transportation, Bureau of Planning, Systems Management Division and Department of Economic & Community Development, Office of Tourism (based on data from Longwoods, International).

## 9 - Rail Safety

### Train Crashes Quite Rare

In 2000, Maine railways experienced just 13 accidents even though they move over 8 million tons of freight per year on about 1,200 miles of track. Although this number is low, train crash frequency has increased over the past few years after a decreasing trend in previous years.

Train crashes are a factor of rail condition, weather and natural conditions, and human factors.



This indicator focuses on train crashes other than at-grade crossing crashes because they are a direct reflection of rail safety. At-grade crossing crashes involve two modes of transport (in most cases, rail and vehicle) and the frequency of at-grade crossing crashes is generally not a function of railway safety but, rather, of driver judgment.

### Impact on the Economy

Safe, reliable train service is important to the economy in a number of ways. The safe movement of goods and passengers is essential if rail is going to be used as an alternative to the highway system. for passengers and freight. Rail crossing crashes have an impact on the economy insofar as they cost money in interruption of rail service, collision damage repair, medical bills and, occasionally loss of life. It should be noted that no fatalities have resulted from car-train crashes at public at-grade crossings since 1992.

### Outlook

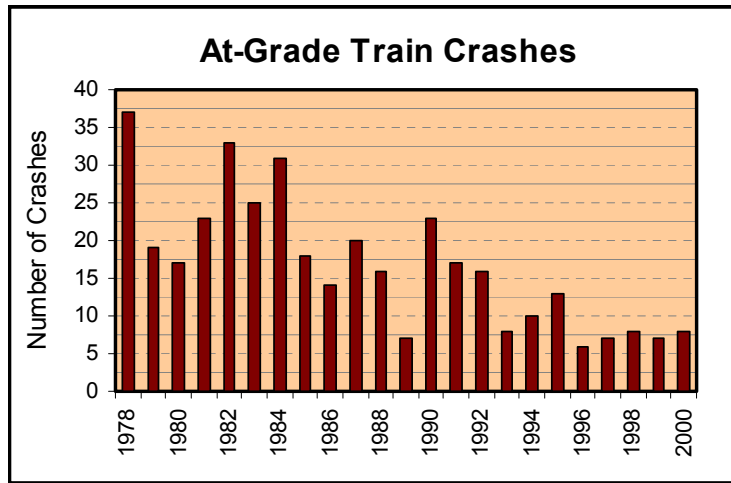
The overall downward trend in the annual number of train crashes is expected to continue for two reasons: equipment and procedures are increasingly safe, and the number of miles of active track has declined. The recent addition of Amtrak passenger rail service between Portland and Boston and the expected increasing use of active rail lines by passenger trains in the near future may work to increase the likelihood of crashes. Overall, a good outcome would be no net increases in the annual number of crashes.

## 9 - Rail Safety (continued)

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### Related Data and Issues

Over the last 22 years, at-grade rail crossing crashes have steadily dropped in Maine, from 37 in 1978 to 8 in 2000, a period during which the state has been aggressive in installing rail crossing signalization devices and other rail crossing safety features. In addition, public outreach campaigns such as “Operation Lifesaver” have focused the public's attention on the danger of highway-rail crossings. Also, the fine for trespassing on rail tracks was increased recently from \$5 to \$100.



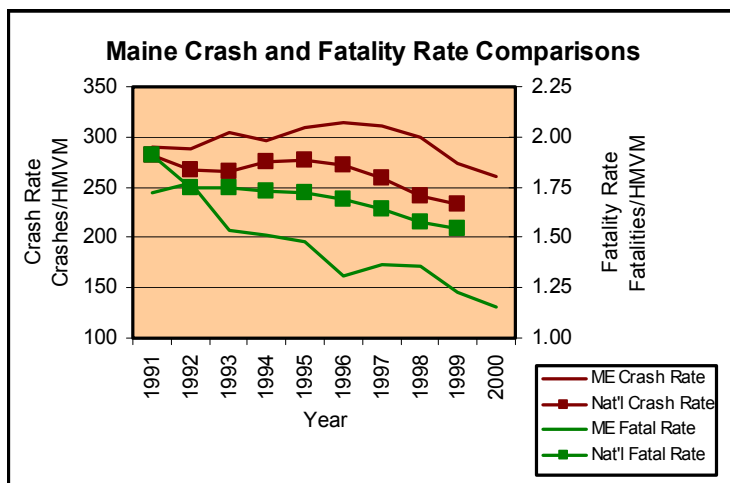
### Data Source

Maine Department of Transportation and the Federal Rail Administration of the U.S. Department of Transportation.

## 10 - Road Safety

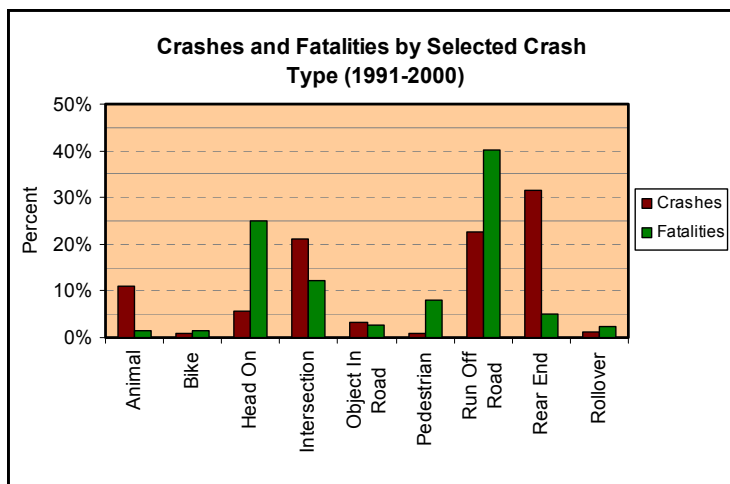
### Maine Roads Are Getting Safer

The number of crashes on Maine's public roads has generally increased over the past ten years, but has declined over the last three years. The number of resulting fatalities has decreased from 202 in 1991 to 165 in 2000. During this same time period, the number of vehicle miles traveled (VMT) has steadily increased. As a result, both the crash rate and fatality rate have dropped.



In 2000, 37,365 crashes occurred on Maine roads. This number translates to a crash rate of 262 crashes per hundred million vehicle miles of travel (HMVM), about 15-20% higher than the national average; however, Maine's fatality rate of 1.15 per HMVM is about 15-20% lower than the national average. So, while Maine experiences a greater frequency of crashes than the national average, its fatality rate is much lower.

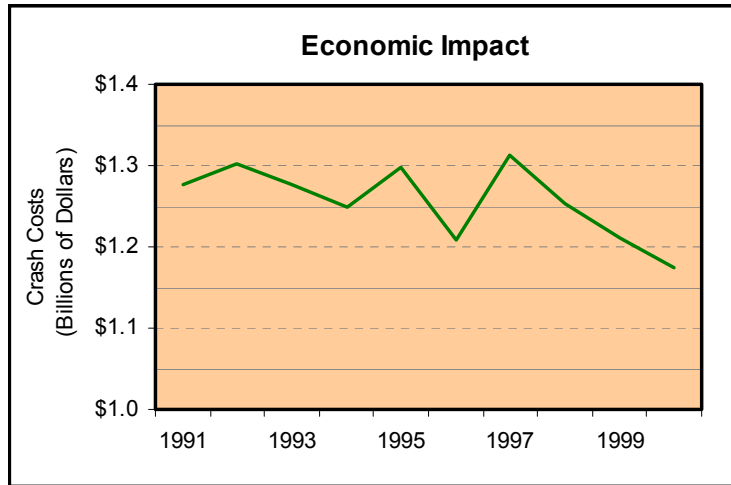
The leading fatal crash types over the past ten years have been Run Off the Road (744 fatalities), Head On (461), Intersection Movement (228), and Pedestrians (151). Certain crashes are on the increase including those in Work Zones, involving Commercial Vehicles, with Large Animals (almost doubled in the last 10 years), and Run Off the Road. Speeding and Driver Inattention/Distraction are the two leading contributing factors in all crashes.



## 10 - Road Safety (continued)

### Impact on the Economy

The economic impact of crashes in Maine in 2000 was approximately \$1.17 billion. These are estimated costs based on police-reported injury severity. This figure does not take into account the consequences of serious injury or death to family, friends, workplace and community. Similar to the crash and fatality rates, the economic impact is also decreasing.



### Outlook

Crashes should continue to trend downward, but vehicle conveniences such as cell phones, CD changers and on-board information systems will all continue to add to the distractions that can affect driver attention. Operational improvements, such as providing wider lanes and shoulders, eliminating roadside obstacles, and improving intersections; plus training and driver awareness programs and law enforcement will all help to counteract the occurrence and severity of crashes. Enhanced vehicle safety features will also continue to provide better protection to vehicle occupants.

### Related Data and Issues

Significant transportation safety issues require attention and in some cases, additional research. As stated above, crashes in Maine involving large animals have almost doubled over the last 10 years. Run Off the Road crashes are the most frequent crash type in the state and represent nearly 41% of the state's total highway fatalities. Head on crashes resulted in another 25% of the fatalities. Aggressive driving practices such as speeding, dangerous illegal passing, following too close, failure to yield the right of way, and disregarding traffic control devices need to be addressed. Strategies to increase public awareness are underway to help lessen these unsafe practices.

Technology presents opportunities to improve safety and enhance communication to the driver about road and traffic conditions. Maine DOT is exploring a number of Intelligent Transportation System advances. An example of this is an Intersection Collision Avoidance Warning System that is installed in Norridgewock. If successful, this innovative system could be installed for a modest cost at numerous stop-controlled intersections that have severe sight distance restrictions. Studies have shown that this system has reduced near miss crashes by 40% and no crashes have occurred since its installation.

## **10 - Road Safety (continued)**

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Improved data quality and quicker access to crash and medical data are needed. Steps being taken on both areas will enhance the ability to define transportation safety needs in a shorter timeframe. Police agencies will soon be able to record crash reports electronically, a change that will reduce the time needed to file reports and improve data quality. Also, the Crash Outcome Data Evaluation System (CODES) project, existing since 1993, will continue to improve the capabilities of matching crash, emergency medical service provider, and medical outcome data.

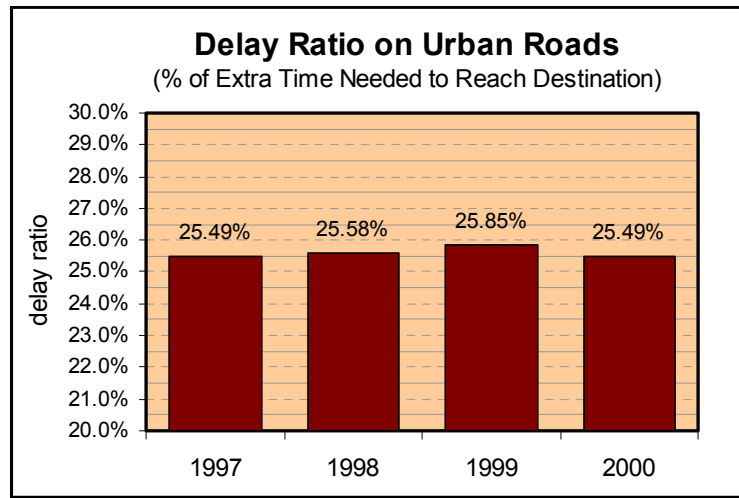
### **Data Source**

Maine Department of Transportation, Bureau of Planning, Systems Management Division. Unit costs by injury severity were obtained from FHWA Technical Advisory T-7570.2 Motor Vehicle Accident Costs October 31, 1994.

## 11 - Road Congestion in Urban Areas

### Congestion Levels Showing Little Change on Urban Roads

Road congestion on Maine's urban arterial streets and highways, as measured by the delay ratio, increased slightly from 1997 to 1999 and showed a decrease in 2000. The decrease of vehicle miles traveled in 2000 (see Indicator 1) could be partially responsible for the decrease in congestion seen in the same year. The delay ratio is the percentage of total traveling time represented by traffic delay. Traffic delay is the excess time required to complete a trip.



A more detailed look at delay for urban and rural roads shows that non-interstate arterials have the highest levels of congestion. Collector roads and streets, a class of highway that feeds arterials, have a lower level of congestion. Interstate and similar highways with controlled access have much less delay than other arterials.

### Impact on the Economy

Although the exact costs are not known, the delay ratio translates directly into lost time, lower productivity, and higher user costs in urban areas. For commercial drivers, the economic costs are particularly pronounced.

### Outlook

Economic growth, changes in vehicle miles traveled, and limited highway and street capacity are important factors that influence urban road congestion. As economic growth continues and congestion costs rise, pressures will also increase to relieve congestion through increased highway capacity and greater use of alternate modes of transportation.

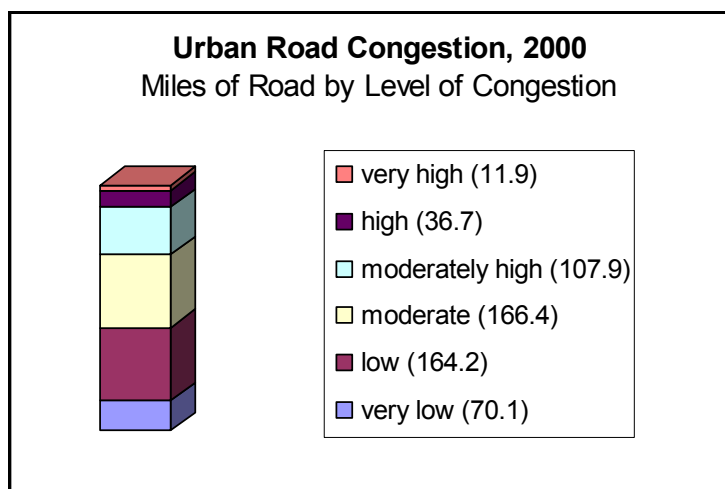
Also, it is worth noting that relatively slow rates of travel are entirely appropriate in urban environments and that congestion relief in such areas should not compromise safety, walkability, accessibility and other important factors in an urban environment.

## 11 - Road Congestion in Urban Areas (continued)

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### Related Data

Another way to assess congestion is to identify the number of miles of road that experience high, moderate, and low levels of congestion. The graph at the right shows that about 12 miles of urban roadway experienced very high levels of congestion during 2000 while 37 miles of road experienced high levels.



### Data Source

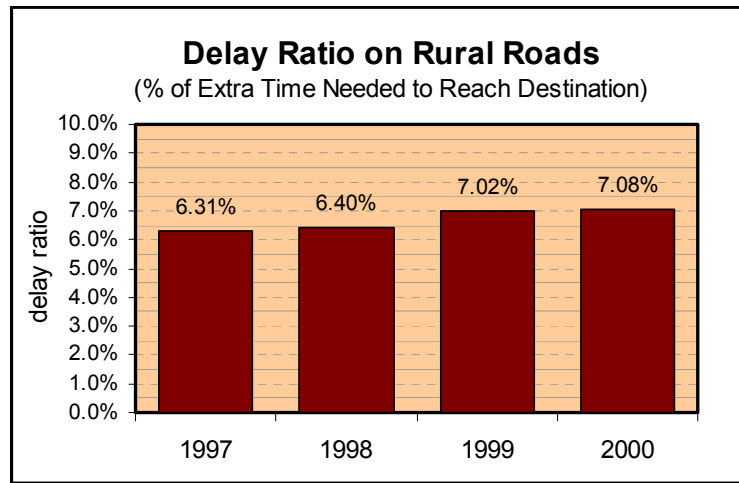
Maine Department of Transportation, Bureau of Planning, Systems Management Division.

## 12 - Road Congestion in Rural Areas

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### Rural Road Congestion on the Increase

The delay ratio on Maine's rural arterials has increased from 6.3% in 1997 to 7.1% in 2000. Congestion on rural roads appears to be increasing at a faster rate than on urban roads, although congestion on rural roads is less than one-third the magnitude found on urban roads. One reason for this faster rate of growth has been the general geographic dispersion of our population. Over the past ten years, more of us have been living in rural areas, farther away from each other and from our jobs and commercial services.



The delay ratio is the percentage of our total traveling time represented by traffic delay. Traffic delay is the excess time required to complete a trip.

### Impact on the Economy

As with urban road congestion, increased rural road congestion also results in lost time, lower productivity, and higher user costs. Because rural roads tend to serve longer trips, congestion on these roads has an impact on the ability to transport people and goods between regions.

### Outlook

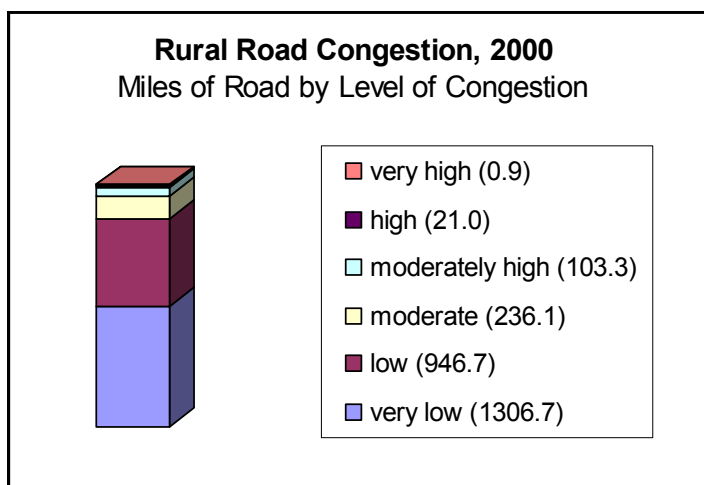
Important factors related to the increase in rural congestion are economic growth, tourism, the trend toward low-density land development, and uncontrolled access to rural highways. Actions that can help minimize rural road congestion include increased capacity where needed, stricter access control on rural arterials, policies that will encourage more compact land development patterns, and use of alternate modes where feasible.

## 12 - Road Congestion in Rural Areas (continued)

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### Related Data

As shown in the graph, 22 miles of rural roads experienced high or very high congestion levels in 2000. About half of Maine's rural roads (1,306.7 miles) experienced very low levels of congestion and about 86% (2,253.4 miles) experienced low or very low levels of congestion.



### Data Source

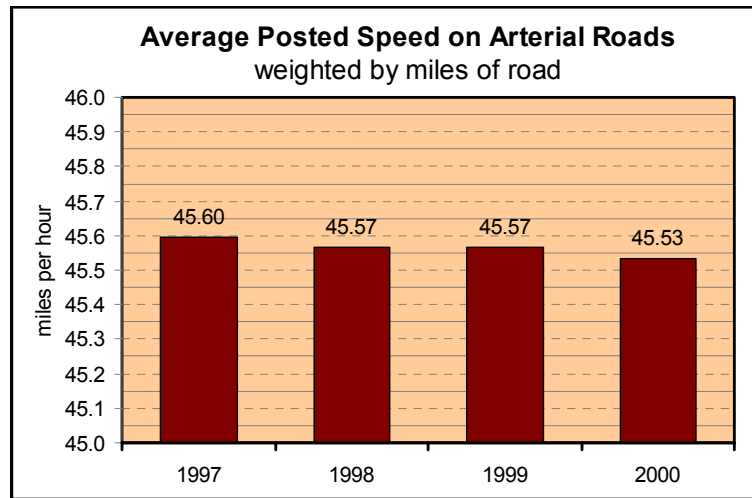
Maine Department of Transportation, Bureau of Planning, Systems Management Division.

## 13 - Highway Speed Related to Development

### Arterial Speeds Slowing Slightly Due to Development

The average posted speed on Maine arterial roads has been slowly decreasing over the past four years, as seen in the graph on the right. About 80% of Maine's arterial roads are in rural areas.

Development along arterial roads increases the number and density of entrances along the route and increases the likelihood of crashes occurring. In response, speed limits are reduced to provide adequate safety. This change lowers the arterials' effectiveness in transporting vehicles from one destination to another.



### Impact on the Economy

Reduced speed limits on the arterial system are detrimental to the Maine economy because a majority of the vehicle miles of travel occur on the arterial highway system. The arterial highway system is expected to provide a high degree of mobility for relatively long trip lengths. Therefore, to provide efficient mobility, arterial highways should provide a relatively high operating speed and level of service. Access to abutting property is not the major function of the arterial system, but rather the function of the collector system and local roads. The most severe impacts of reduced speeds on the arterial system are to commerce, where longer travel times between destinations translate into lost time, lower productivity and increased user costs.

### Outlook

Access control on Maine's arterial system is crucial in protecting the integrity of the system and the financial investment in construction and maintenance of that system. It is likely that development pressure will continue along the arterial highways, therefore, access management will emerge as a vital tool to maintaining a safe and efficient system.

## **13 - Highway Speed Related to Development (continued)**

### **Related Data and Issues**

In 2000, almost 15% of the rural arterials were posted at 45 mph or less. Although posted speeds are a good indicator of highway degradation due to more access points, posted speeds alone are not a good indicator of actual speeds. Traffic volume, capacity, and degree of access control are also important factors. Posted speed limits combined with these factors translate into actual travel speeds.

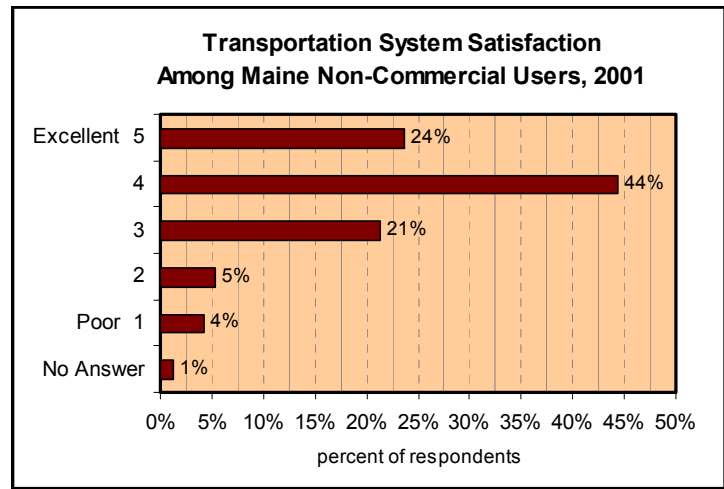
### **Data Source**

Maine Department of Transportation, Bureau of Planning, Systems Management Division.

## 14 - Satisfaction Among Non-Commercial Drivers

### Transportation System Gets High Marks for Non-Commercial Uses

Apart from strictly commercial uses such as freight delivery and business travel, Maine's transportation system contributes enormously to our quality of life. To assess citizen satisfaction with the transportation system for non-commercial uses, a statewide representative sample of citizens was asked, "On a scale of 1 to 5 where 1 means "Poor" and 5 means "Excellent," how would you rate Maine's road transportation system in meeting your personal needs such as commuting to work, running errands, and visiting people, places and events?"



The average rating was 3.8 points, which reflects a fairly favorable opinion (see the scale on the graph). More than one in five people said that the system was "excellent" for meeting personal needs.

### Impact on the Economy

Quality of life issues such as this one impact the economy indirectly. They contribute to why people want to live here and do business here. That Maine people generally think positively of the transportation system for non-commercial uses bodes well for business attraction and retention.

### Related Data and Issues

To further understand public opinion about the transportation system, citizens were also asked how much they agreed or disagreed that certain improvements to Maine's transportation system were needed. About 23% of those questioned strongly agreed that "pavement condition" was in need of improvement. About 21% strongly agreed with "traffic congestion relief" and about 18% with improvements to "secondary highways and local roads."

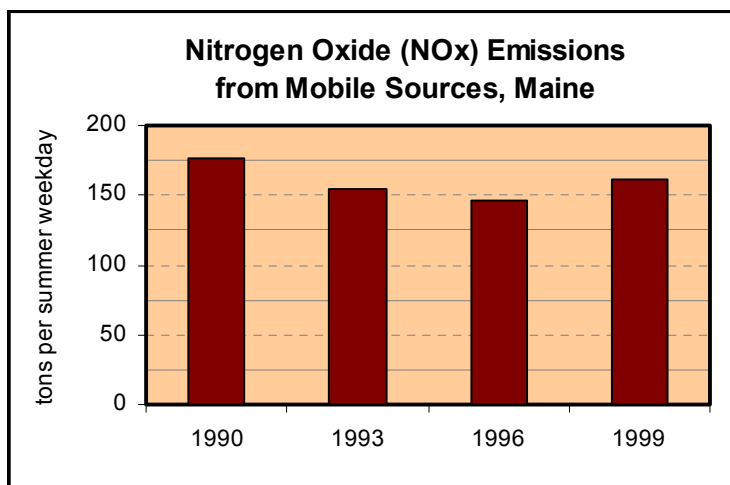
### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

## 15 - Environmental Impact

### Emissions from Mobile Sources Lower but on the Rise

In Maine, during 1999, motor vehicles, trains, planes, and vessels released an average of about 161 tons of nitrogen oxides (NOx) into the atmosphere every summer weekday. This amount is about 10% more than what was released from such sources in 1996, but is still 9% less than 1990 totals.



Almost 60% of all NOx pollution comes from mobile sources, mostly moving vehicles. The amount of pollutants such as NOx emitted by a motor vehicle is the result of several factors: vehicle miles traveled, vehicle type, vehicle age, vehicle speed, and type of gasoline. Throughout the early 1990s, overall declines in total NOx released from Maine motor vehicles was most attributable to newer, cleaner running vehicles. While the number of vehicle miles traveled increased steadily over these years, new vehicles are about 99% cleaner than vehicles made in the 1960s. In recent years, NOx emissions have begun to see an increase due to several possible factors. In the late 1990s, VMT grew at an even faster rate than in the earlier part of the decade. Also, in recent years many larger, less efficient vehicles, such as minivans and sport utility vehicles, have become more prevalent on our roads.

### Impact on the Economy

NOx are one of three major types of pollution emitted by motor vehicles (others include carbon monoxide and volatile organic compounds). They include all compounds of nitrogen and oxygen (such as nitrogen monoxide and nitrogen dioxide). NOx, produced almost entirely by human activities, is a significant contributor to smog and ground-level ozone, which forms when NOx and Volatile Organic Compounds (VOC's) react in the presence of sunlight and heat.

Ground level ozone in high concentrations is a severe irritant that can cause coughing, shortness of breath, wheezing, headaches, nausea, stinging eyes, and chest pain. Everyone is susceptible, but people who suffer from lung diseases, such as emphysema, bronchitis, pneumonia, asthma, and colds, as well as children, exercising adults, and the elderly are especially vulnerable.

This impacts the economy because it requires us to implement costly measures to reduce emissions and because it may act as a deterrent to people visiting Maine from away.

## 15 - Environmental Impact (continued)

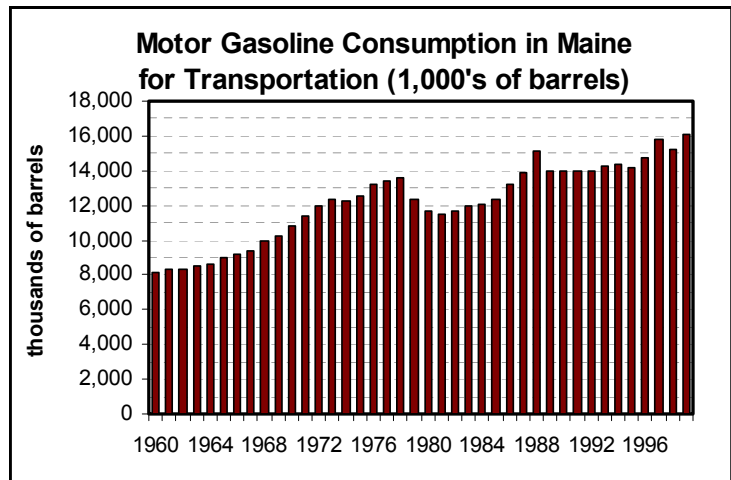
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### Outlook

The amount of ground-level ozone that is produced is influenced by the amount of nitrogen oxides and volatile organic compounds that we emit into the atmosphere combined with the amount and intensity of sunlight. It appears that emissions are starting to rise again, and it also appears that summer temperatures are on the rise. Experts suggest that reducing our use of motor vehicles is the single most effective thing we can do to reduce ground-level ozone.

### Related Data and Issues

As shown in the graph to the right, the amount of gasoline consumed grew steadily from 1960 to 1973, as did the number of vehicle miles traveled during that time. In 1979, the amount of gasoline consumed actually began to decrease due to an energy crisis. From 1989 to 1995, the amount of gasoline consumed remained relatively constant due to increased vehicle efficiency, even though vehicle miles traveled increased steadily in those years. Gasoline consumption in recent years has begun to rise again.



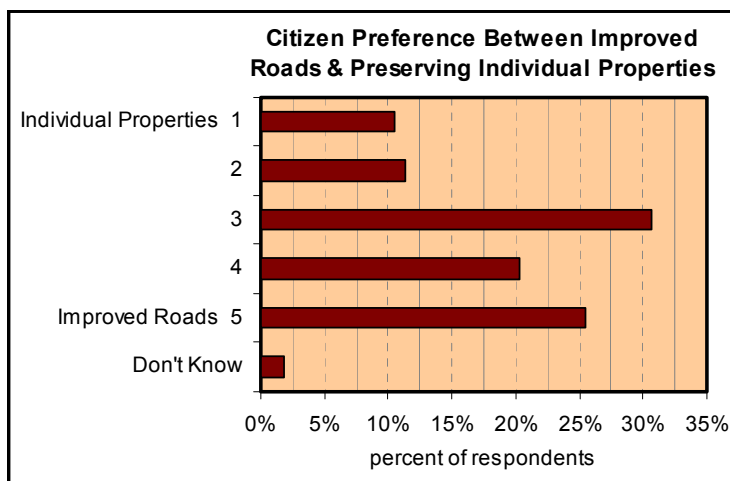
### Data Source

Maine Department of Environmental Protection, Bureau of Air Quality, based on data provided by Maine Department of Transportation and Department of Motor Vehicles, and US Department of Energy, Energy Information Administration.

## 16 - System Impact on Sense of Community

### Impact on Sense of Community Difficult to Quantify

In addition to affecting our ability to move from place to place and ship goods, the transportation system affects our “sense of community” by virtue of roads and railways going through our neighborhoods. For instance, faster roads help us get to work more quickly but they also diminish neighborhood qualities.



In order to assess the general perspective of Maine people on this issue, the Survey of Maine Citizens and Businesses asked: “Using a scale from one to five where one is 'very strong disagreement' and five is 'very strong agreement', how do you feel about the following statement? 'Changes on Maine's major roads to make them smoother, wider, straighter, and less congested should be made even when those improvements affect individual properties.'”

The statewide mean response to this question was 3.4, so the results of this question tend to indicate a slight preference towards improving roads over preserving individual properties. As the survey continues to ask this question over time, a visible trend may emerge.

### Impact on the Economy

The extent to which neighborhoods provide safe, quiet living environments has an indirect affect on economic growth. It is among the many reasons that people like to live and work in Maine.

### Related Data and Issues

Via the statewide survey, citizens were also asked, “Consider the most recently completed road or bridge construction project near your home. What effect has this completed project had on your sense of community?” About 55% of the respondents said that the effect was positive while 10% said it was negative.

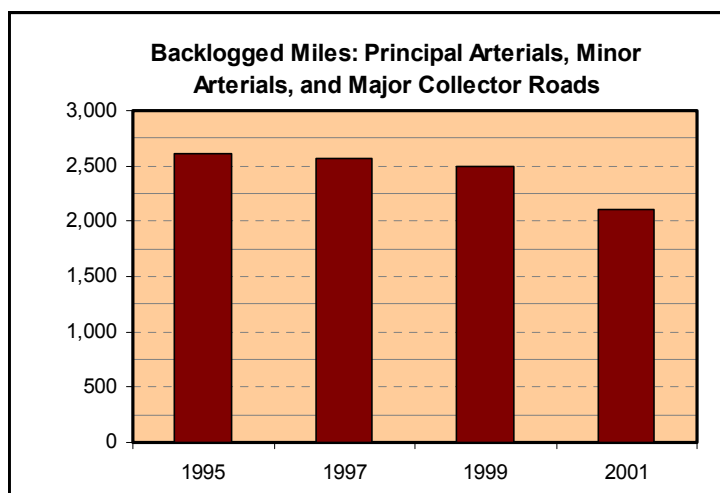
### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

## 17 - Road Condition

### Miles of Poor Roads Decreasing

Approximately half of the 8,328 miles of the state's highway network that are maintained by MaineDOT are constructed to modern standards. Among the roads that are not built to modern standards (known as the 'backlog') 2,111 miles are principal arterials, minor arterials, and major collector roads. These roads provide vital links to destinations and other modes of travel throughout Maine.



Roads constructed to modern standards (not backlogged) are smooth highways with gradual curves and slopes, good sight distances, an adequate structural base, adequate shoulders, and drainage to move water away from the highway. By contrast, 'backlog' roads represented in the graph could have abrupt curves, sudden dips and rises, poor sight distance caused by trees and bushes closing in around the edge of pavement, and little or no shoulders or ditching for drainage. These roads can be damaged easily by heavy loads and quite often have to be posted in the spring (signs put up restricting use by heavy trucks) due to the lack of a good structural base.

### Impact on the Economy

Road conditions directly impact the ability to move people and goods over the state's highway network. When backlogged roads are posted in the spring, businesses and their customers are affected. Substandard roads also create increased user costs by more frequent vehicle repairs and increased numbers of crashes. Delays from inadequate traffic capacity and increased highway maintenance activities cause decreased fuel economy, reduced air quality, and lost productivity.

### Outlook

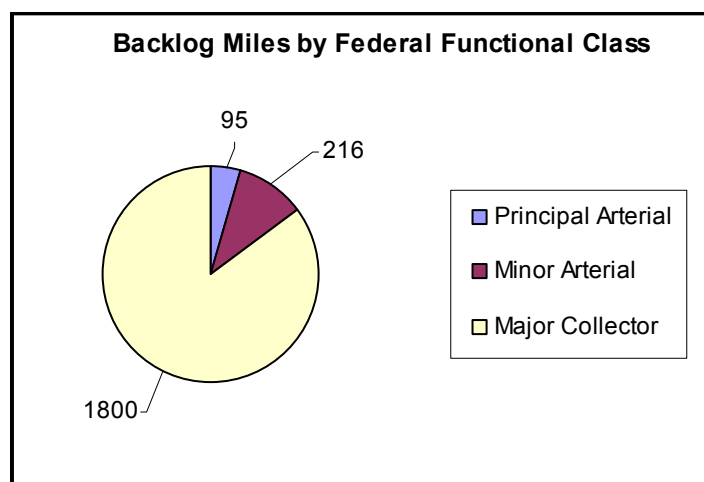
The state plans to invest \$60 million per biennium to address the backlog of substandard roads. This investment is equal to approximately 104 miles of highway improvements per biennium. It will bring 100% of the principal arterials, 80% of the minor arterials, and 30% of the major collectors up to standard in 20 years. The 2002/2003 Biennial Transportation Improvement Program (BTIP) addresses 222 miles of principal and minor arterials and major collectors, which doubles the goals in the 20-Year Plan.

## 17 - Road Condition (continued)

The biggest factor that favors reaching desired goals is increased funding that will allow more reconstruction to take place. Other factors are innovative methods of reconstruction and advanced technology in materials. The cyclical nature of the economy and the corresponding changes in the level of funding all work against achieving these goals. With funding dollars going first to system preservation and maintenance, the amount left for reconstruction can fluctuate depending on the preservation needs and the total available funding.

### Related Data and Issues

As the pie chart shows, there are relatively few miles of principal arterials that are not built to modern standards. However, in addition to the types of roads reflected in the chart, there are approximately another 1,700 miles of minor collectors also in need of reconstruction which will be the focus of new programs such as the Urban-Rural Initiative Program (URIP).



The huge investment in highways that have already been constructed needs to be preserved to keep the investment from deteriorating to the point of needing another expensive reconstruction. Therefore, each Biennial Transportation Improvement Program (BTIP) must first preserve the built sections with overlays that have an 8-12 year life cycle and also keep the backlog sections serviceable with a thin maintenance coat until reconstruction can take place. System preservation and maintenance needs to be done before reconstruction.

There are approximately 1,000 miles of roads with posted springtime weight limits in the major collector and higher classifications. As funding is allocated, posted roads are given a higher priority, an approach that will greatly reduce the need for springtime postings in the future.

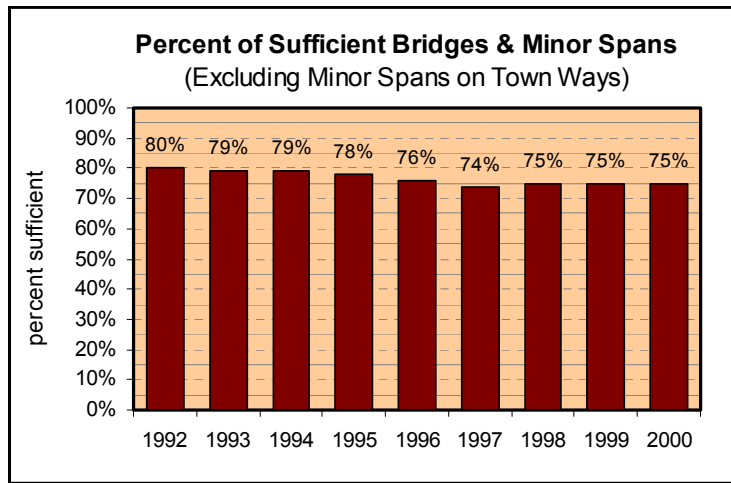
### Data Source

Maine Department of Transportation, Bureau of Planning, Systems Management Division.

## 18 - Bridge Condition

### Bridges and Minor Spans in Need of Improvement

The State of Maine has responsibility for 2,962 bridges and minor spans. Minor spans are defined as structures 10 feet to 20 feet long and bridges are generally defined as structures equal to or greater than 20 feet in length. These structures are on state highways and public roads with the exception of minor spans on town ways, which are excluded from this analysis. Using federal *Sufficiency Rating* procedures (see below) it is estimated that 75% of these structures are structurally and functionally sufficient such that they are not likely to need capital improvements for at least 10 years. A sufficiency rating of greater than 60 indicates capital improvement is not likely for at least 10 years, except for the possibility of paint or wearing surface work. Tracking the percentage of structures with a sufficiency rating of greater than 60 is a good proxy for the overall condition of Maine's bridges and minor spans.



### Impact on the Economy

Bridges and minor spans are absolutely critical to the highway system. If a structure fails, the road that travels over it fails. Furthermore, bridges and minor spans represent a very sizable infrastructure investment on behalf of the government. Maintaining that investment and facilitating the flow of commerce has a large impact on the state and local economies. It is nearly impossible to imagine a functioning economy without them.

### Outlook

Since 1998, the MaineDOT annual investment for structures has been about \$12 million for maintenance and \$40 million for capital improvements. That level of funding will not adequately address the projected capital improvement needs of Maine's structures, however. The aging of Maine's interstate bridges and those structures built during the Depression era will lead to an increased demand for funding in order to maintain the current level of sufficient structures.

## 18 - Bridge Condition (continued)

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### Related Data and Issues

The 75% of bridges with a sufficiency rating of greater than 60 are Maine's best bridges. Even though they are in good condition, some will need capital improvement starting as soon as 10 years.

### Data Source

Maine Department of Transportation, Bureau of Planning, Systems Management Division.

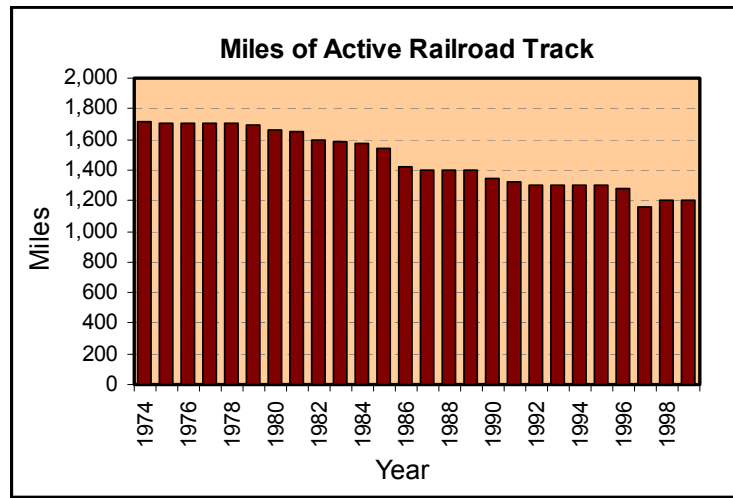
**A note on the Federal Sufficiency Rating:** The federal government gives structures a sufficiency rating based on a combination of four separate factors to provide a number from 0 to 100 (0=worst, 100=best) that reflects the overall sufficiency of each structure. The four general categories used in the computations are:

1. Structural Adequacy and Safety
2. Serviceability and Functional Obsolescence
3. Essentiality for Public Use
4. Special Reductions (detour length, traffic safety features)

## 19 - Railways in Active Service

### Miles of Active Track Decreasing

The number of miles of railroad track in active service has been steadily declining for the past several years, from 1,715 in 1974 to 1,199 in 1999. This trend is an indicator of the regulation of the rail and trucking industry and the shipping community's increasing reliance on using trucks to transport their products.



### Impact on the Economy

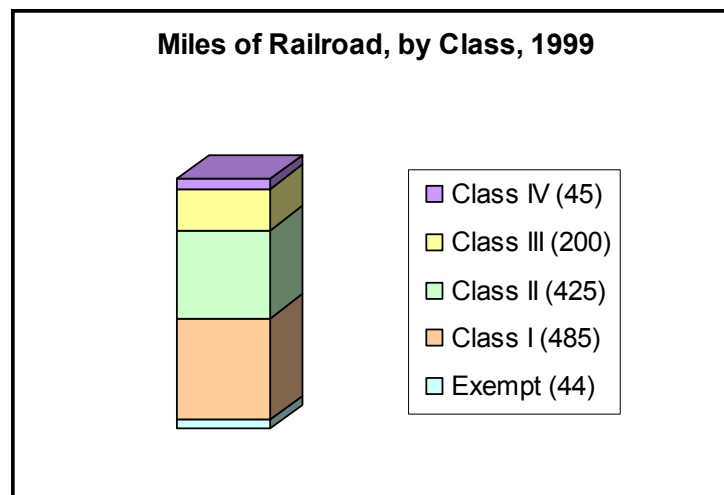
The quality of rail is a critical factor in how well the state's rail system performs in providing an alternative to passengers and shippers. With a well-maintained rail system, rail service improves and, thus, creates more choices and competition for passenger and freight transportation.

### Outlook

Maine's trackage is scheduled to be rehabilitated and upgraded over the next ten years. The state is also working to attract short-line operators. The trackage from Portland to the New Hampshire border has reached Class IV standards with the introduction of Amtrak service. Scheduled major state rehabilitation projects include Brunswick to Lewiston, Brunswick to Rockland, Brewer to Calais, and Brunswick to Augusta.

### Related Data and Issues

Most of the rail line abandonments that have occurred over the past twenty years have been in rural areas. This trend makes it increasingly difficult for rural manufacturers and other freight shippers to have competitive choices for transporting goods.



## **19 - Railways in Active Service (continued)**

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As shown in the graph on the previous page, Maine has 200 miles of Class III track that can accommodate freight train speeds from 25 to 40 miles per hour and passenger train speeds from 25 to 60 miles per hour. Class II track has a maximum speed limit of 25 miles per hour and Class I track has a maximum speed limit of 10 miles per hour. The 45 miles of class IV track, due to the Amtrak project, can accommodate passenger rail speeds of up to 79 mph.

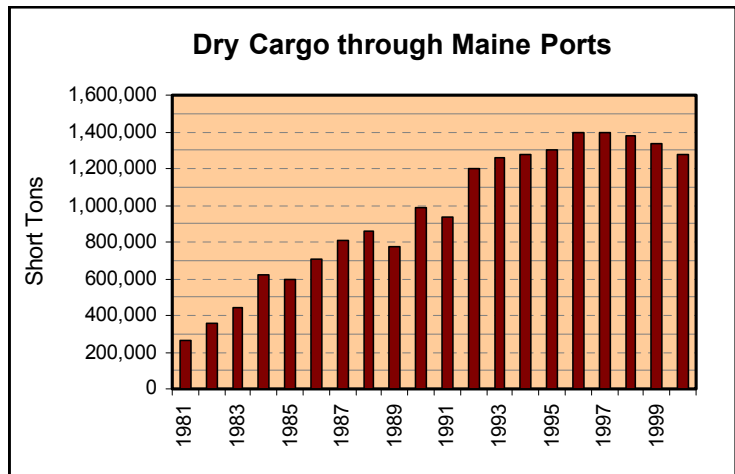
### **Data Source**

Maine Department of Transportation, Office of Freight Transportation.

## 20 - Cargo Port Condition

### Port Traffic Appears to be Slowing

Over the last twenty years, Maine's major ports of Eastport, Portland, and the Penobscot region (Searsport, Rockland, and Winterport) have grown significantly from processing 267,718 short tons in 1981 to nearly 1.3 million short tons in 2000. This represents a five-fold increase. In the last few years, however, annual tonnage growth has leveled off and even started to show a decline. This recent trend can be attributed to both the economic downturn in Asia and the fact that Maine's ports have reached their capacity and require new investment in order to continue to grow.



### Impact on the Economy

The ability of Maine's businesses to grow and expand is in large part due to how well they succeed in delivering their products to international markets. Maine's ports play a valuable role in this process by providing a cost-effective alternative to shipping via out-of-state ports.

According to a methodology endorsed by the American Association of Port Authorities, it is estimated that about 1,700 jobs result directly from the Maine port industry.

### Outlook

The outlook for Maine's ports is very positive due to recent and ongoing port investments. A \$20 million terminal expansion in Eastport was completed in 1997 and now offers Washington and Hancock County shippers a state-of-the-art facility. In Searsport, a unique \$25 million public-private partnership will allow the current occupants of the Mack Point facility to rehabilitate their existing facilities to modern standards while repaying the state's participation over a twenty year period. About \$7 million of this amount comes from private investment. This will capitalize the Maine Port Authority for future projects. Lastly, in Portland, the planned separation and expansion of the passenger and container operations will ensure their continued growth.

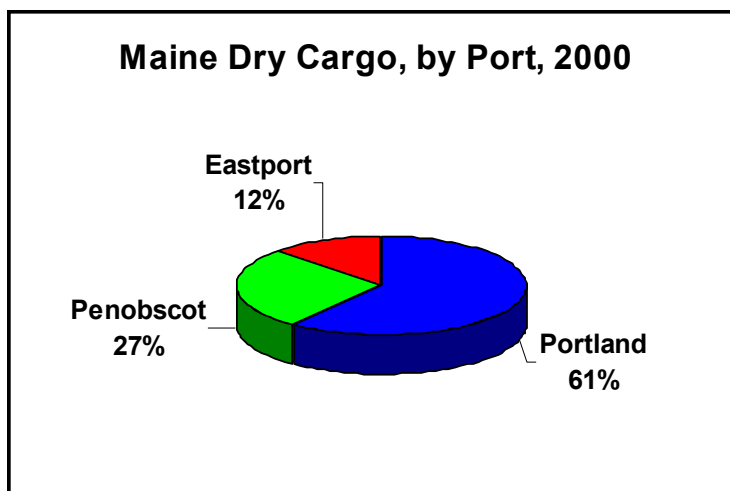
## 20 - Cargo Port Condition (continued)

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### Related Data and Issues

As shown in the graph, the Penobscot region and Portland are Maine's two largest ports and, combined, they account for about 88% of Maine's port traffic. Eastport accounts for about 12%.

The downturn in the Asian economy during the late 1990s created a soft market for many of Maine's export products. Such uncontrollable situations as economic conditions in other ports of the world drive port tonnage both up and down regardless of the condition of Maine facilities.



Maine also handles a large amount of liquid cargo shipments such as oil. In fact, the Port of Portland is the third largest liquid cargo port on the east coast. In 2000, Maine ports handled more than 200 million barrels of liquid cargo.

### Data Source

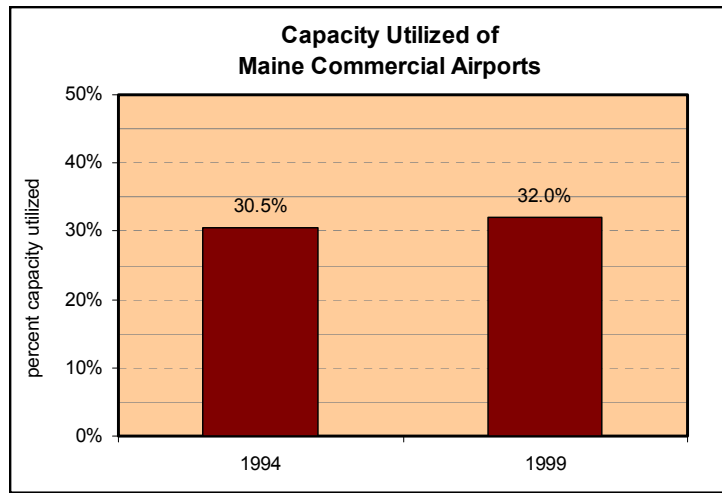
Maine Department of Transportation based on U.S. Coast Guard Port Operators Reports.

*Note:* In 2000 MaineDOT began combining the ports of Searsport, Rockland, and Winterport into the new category of Penobscot.

## 21 - Airport Capacity

### Maine Commercial Airports in Good Condition

Maine commercial airports, as a whole, are operating at about 32% of their runway capacity on average, an indication that their infrastructure is in good condition. The quality and capacity of Maine's airports affects their ability to meet demand and to attract expanded air services. Portland Jetport, Maine's busiest airport, is currently operating at about 54% of its runway capacity. Optimum runway capacity utilization is about 80%.



An airport operating at levels well below capacity is an indicator that its condition is good, although it's not contributing fully to the economy. When an airport is operating at too high a capacity, delays cause negative economic impacts.

Runway capacity is just one component of an airport's overall capacity, although this indicator regards it as a proxy for overall capacity. Other factors include automobile parking, access, and terminal size.

While no airports are reaching capacity constraints, Portland is experiencing pressure on its parking and terminal facilities. Numerous projects are underway or scheduled to address runway, access and parking capacity issues at Portland.

### Impact on the Economy

Commercial air service is critical to Maine's economy. It supports tourism, manufacturing, and the service sector. In 1994, the following economic benefits resulted from commercial aviation:

- \$553 million in total aviation related spending
- 12,100 jobs directly and indirectly attributed to aviation
- \$196 million direct and indirect payroll
- 11.4% of Maine's employment is tied to the availability of commercial air service.

Access to convenient airports is critical to attracting new businesses to Maine and to the expansion of existing companies.

## 21 - Airport Capacity (continued)

### Outlook

The Maine Department of Transportation has identified the following strategies and projects to address aviation facility need:

- implement a runway pavement management program
- develop intermodal facilities at major airports
- reconstruct and rehabilitate runways
- expand terminals
- expand freight and cargo facilities and warehouses
- increase parking capacity
- improve instrument landing capabilities
- assist airports in meeting requirements for economic development designation

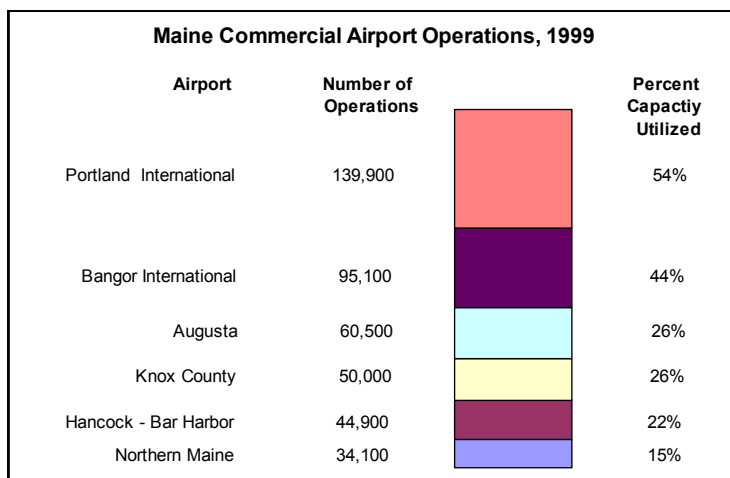
An estimated \$35 million in federal and state funding will be invested in Bangor, Portland, Presque Isle, and Hancock County/Bar Harbor airports over the years 2000 to 2004. Runway improvements have been scheduled over the next four years to improve pavement condition at Bangor, Portland, and Presque Isle.

### Related Data and Issues

The graph to the right shows a breakdown of activity levels at Maine's six commercial airports. In addition to these, there are 29 non-commercial airports in Maine.

### Data Source

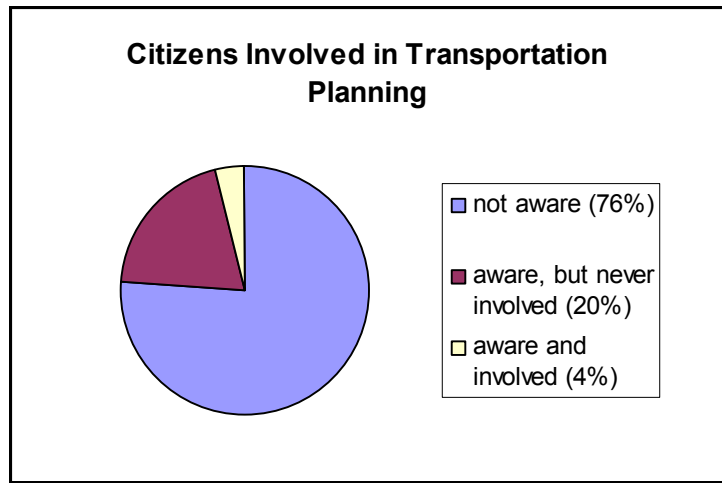
Maine Department of Transportation,  
Office of Passenger Transportation.



## 22 - Public Involvement in Transportation Planning

### Most Citizens Unaware of Opportunities for a Role in Transportation Planning

In September 2001, just 24% of Maine citizens reported that they were aware that they could become involved in state transportation planning and project development. Of those 24%, only 16%, (4% overall) had attempted to become involved in transportation planning.



### Impact on the Economy

In order to continually assist economic growth, the transportation system must be responsive to changing needs and perspectives of those who use the system. This indicator is a proxy for the extent to which transportation planning takes into account the perspectives of Maine citizens.

### Related Data and Issues

The 4% of people who reported being involved in transportation planning were also asked: “Where 5 equals strongly agree and 1 equals strongly disagree, what is your level of agreement with the following statement: Once involved in transportation planning, I felt that my ideas and opinions were fairly considered.” About 13% strongly agreed with the statement while 9% strongly disagreed.

### Data Source

Maine Development Foundation 2001 Survey of Maine Citizens and Businesses. Survey results do not reflect the views of the Maine Development Foundation.

## Appendix A - Glossary

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**Access Management** - the control of driveway and local street access along surface (non-freeway) streets - primarily arterials and major collectors.

**Arterials** - roads providing longer through travel between major trip generators such as larger cities or recreational areas.

**Backlogged Roads** - roads that are not built to modern standards.

**Bridge** - A structure that carries a public road and is 20 feet or longer.

**Collector Roads** - roads that collect traffic from the local roads and also connect smaller cities and towns with each other and to the arterials.

**Commercial Airport** - an airport that has regularly scheduled commercial flights in addition to chartered and private flights. Maine's commercial airports include Portland International, Bangor International, Augusta, Knox County Regional (at Owl's Head), Hancock-Bar Harbor (at Trenton), and Northern Maine Regional (at Presque Isle).

**Controlled Access** - a controlled access highway is one on which priority is given to through traffic by providing access only at interchanges or intersections with selected public roads. Abutting property owners have no right of direct access.

**Delay Ratio** - the percentage of total traveling time represented by delay. Delay is the excess time required to reach one's destination due to traffic congestion.

**Intermodal Facility** - a facility at which passengers or freight are transferred between two or more transportation modes.

**Local Roads** - roads primarily providing access to private property or low volume public facilities.

**Minor Arterial** - streets and highways linking cities and larger towns in rural areas, or distributing trips to small geographic areas in urban areas (not penetrating identifiable neighborhoods.)

**Minor Span** - A structure that carries a public road and is 10 feet to 20 feet long.

**Mode** - a method or form of transportation, such as a plane, train, automobile, boat, etc.

**National Highway System** - a designated system of major roads including interstate highways and other principal arterial routes, approved by Congress in 1995 as a way of focusing federal resources on the nation's most important roads. Nationwide, this system comprises approximately four percent

## **Appendix A - Glossary (continued)**

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of public roads, while carrying more than 40 percent of the nation's highway traffic. In Maine, this system is comprised of more than 360 miles of interstate highway and more than 900 miles of non-interstate principal arterials.

**Principal Arterial** - major streets or highways, often with multi-lane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel.

**Short Ton** - a unit of weight equal to 2000 pounds.

**Vehicle Miles Traveled** - the total number of miles traveled by all vehicles in a given area over a certain period of time.

## **Appendix B - Survey Methodology**

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### **2001 Surveys of Maine Citizens and Maine Businesses Administered by the Maine Development Foundation**

#### **Introduction**

In 2001, the Maine Development Foundation retained two companies to administer its annual survey of Maine citizens and Maine businesses on behalf of the Maine Economic Growth Council and a variety of state agencies and non-profit organizations. Market Decisions, Inc, of South Portland, Maine, was hired to design and conduct the Business Survey, and Strategic Marketing Services (SMS) of Portland, Maine, was hired to design and conduct the Citizens Survey. This is a change from previous years when Market Decisions conducted both surveys.

#### **Maine Citizen Survey**

The Maine Development Foundation retained Strategic Marketing Services (SMS) of Portland, Maine, to design and conduct the Citizen Survey on behalf of the Maine Economic Growth Council and a variety of state agencies and non-profit organizations. A number of questions asked in the 1995, 1996, 1997, 1998, 1999, and 2000 survey were repeated in the 2001 survey. Changes to the wording of survey questions were kept to a minimum in order to maintain the ability to track results over time. The 2001 methodology is described in detail below. The methodology used for the survey conducted in 1995, 1996, 1997, 1998, 1999, and 2000 was very similar, although the dates and exact numbers of those surveyed and those who responded were slightly different.

The Statewide Citizen Survey was conducted by telephone between August 20 and September 6, 2001. The Citizen Survey was conducted among a statewide sample of 601 Maine households. A sample of this size yields a sampling error of +/- 4.00 percentage points with 95% confidence at the total sample level. The methodology ensured that an adequate number of parents with children living at home answered questions pertinent to parents in Maine (questions 75-93 in the report). In total, 425 parents were interviewed. Among parents, this sample size yields a sampling error of +/- 4.75% at the 95% confidence interval. In all cases, a two-stage sampling process was used to identify individuals within households. Strategic Marketing Services generated a random statewide sample of telephone numbers. After contacting a randomly selected household, the survey was conducted with the adult who celebrated the most recent birthday.

The survey instrument was pre-tested with persons unfamiliar with the study and was refined to correct question wording that may have been unclear to some respondents. The final instrument

## **Appendix B - Survey Methodology (continued)**

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included approximately 139 questions and the actual respondent interviews averaged 32.5 minutes in length.

All interviewing was conducted by SMS. Among those households contacted for the survey, 502 refused to be interviewed, 85 terminated the interview prior to its completion and 601 completed the study for a 51% cooperation rate.

### **A Cautionary Note on Sub-Samples**

The sampling errors and levels of confidence cited for each survey above refer to the total group of respondents in each case and are not the same for sub-samples. For instance, the responses of just women, or just college-educated people are not as statistically valid as are the aggregate data from ALL those who responded. Sampling errors and levels of confidence for specific sub-samples can be determined by request if necessary.

## **Maine Business Survey**

The Maine Development Foundation retained Strategic Marketing Services (SMS) of Portland, Maine, to design and conduct the Citizen Survey on behalf of the Maine Economic Growth Council and a variety of state agencies and non-profit organizations.

Maine Business Survey methodology was consistent with methodology used for the surveys conducted in 1995, 1996, 1997, 1998, 1999 and 2000, although the dates and exact numbers of those surveyed and those who responded were slightly different.

The Maine Business Survey had two mailings out. The first one was mailed out on August 31, 2001. In total, surveys were mailed to 2,000 firms in Maine. Each respondent was sent a six-page survey booklet, a letter from the Honorable Angus S. King, Jr., Governor of Maine, seeking cooperation in completing the survey, and a Market Decisions business reply envelope. The survey packets were addressed to the owner or the person identified as the chief executive officer of the company.

The sample list was generated from the Tower Publishing state business directory for Maine. The population of known Maine companies was divided into manufacturing and non-manufacturing categories. Within each of these groups, size of the company – small (1 to 19 employees), middle size (20 to 99 employees) and large (more than 100 employees) identified sub samples.

We have chosen a stratified sample in order to achieve a sample which would provide meaningful

## **Appendix B - Survey Methodology (continued)**

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results by size and type of company.

A total of 2000 surveys were initially mailed; 27 surveys were returned for non-delivery and 11 surveys were sent back to us blank with notes explaining that the addressee moved, closed business, etc. Therefore, 1962 surveys were actually delivered to addressees.

After the first mailing, we received 241 surveys back (response rate 12%). Reminder postcards were sent out one week after the initial mailing to encourage further cooperation. It increased response rate from 12% to 22%. On September 19, we sent out another 1600 surveys to the same firms in Maine, excluding those companies that already filled out the questionnaire.

The survey included 64 questions.

On October 1, a total of 663 completed surveys were returned for a response rate of 34%. A random sample of 663 would be expected to yield a maximum sampling error of +/- 3.81 percentage points. However, because of the stratified nature of the sample, which allows for more reliable examination of the sub sample, the sampling error is actually considerably larger (+/-6.7%). Confidence interval for all results is 95%.

Sampling methodology didn't take into account response rate, and it is still subject to self-selection that introduces a non-determinable, non-response bias.

## Appendix C - Related Documents

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***Biennial Operations Plan.*** A transit plan required by Maine Law to maximize coordination of funds from all state agencies that sponsor transportation services, and to outline procedures for the development and maintenance of a permanent and effective public transportation system, with particular regard to low-income, elderly, and handicapped residents. Updated regularly - last revised in 2002 (Office of Passenger Transportation)

***Biennial Transportation Improvement Program.*** A funding document requiring State Legislature approval every two years. This document is a project-specific expression of the goals, objectives and strategies outlined in the Department's Twenty-Year Plan and the project priorities of the Department's Six-Year Plan. It describes how the Department proposes to apply millions of dollars in capital funding towards the study, design or construction of multi-modal transportation improvements throughout the state. The current BTIP funds project for fiscal years 2002 and 2003, or July 1, 2001 through June 30, 2003. (Department of Transportation)

***The Cost of Sprawl.*** A discussion of costs to taxpayers, the environment and community character. Emphasis on personal decisions. Also discusses future directions. May, 1997 (Maine State Planning Office)

***Maine Integrated Freight Plan.*** An inventory of the current freight transportation network, identification of major and minor shortcomings, a methodology for assessing project benefit/cost ratios, and a policy for addressing potential public-private investments and to target projects. 2002. (Office of Freight Transportation and Freight Transportation Advisory Committee)

***Maine State Aviation Systems Plan.*** A plan designed to guide growth of aviation community for the next twenty years. Includes an inventory of existing facilities, projections of aviation demand, adequacy review and recommended system improvements, facility requirements, and an implementation plan. 2002 (Office of Passenger Transportation)

***Maine State Ferry Service Strategic Plan.*** A five-year strategic plan developed to address the needs and deficiencies of the State Ferry Service. 1996 (Office of Passenger Transportation and Maine State Ferry Service Advisory Board)

***Maine Strategic Passenger Transportation Plan.*** A visitor oriented strategic plan that proposes to develop an integrated system of modal options that will attract travelers to Maine, and provide modal choice for Maine's citizens. 2002 (Office of Passenger Transportation and Passenger Transportation Advisory Committee)

***Maine Transportation Facts.*** A pocket-sized fact book containing basic charts, graphs and tables about transportation in Maine. The intent of this booklet is to provide answers to frequently asked questions from municipal officials, planning organizations, legislators and the general public. 2002 (Department of Transportation)

## Appendix C - Related Documents (continued)

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**Maine Turnpike Authority Ten-Year Plan.** A plan required of the Maine Turnpike Authority by the Sensible Transportation Policy Act. The MTA plan includes an inventory of transportation systems, forecasts of travel demand for the system under MTA jurisdiction, functional standards for transportation systems under MTA jurisdiction, identification of the nature and extent of current and future deficiencies and needs of system under MTA jurisdiction, and MTA's recommendations for transportation improvement strategies, project priorities, and multi-modal projects and programs within its jurisdiction that should be considered by MaineDOT in preparing and approving the Statewide plan. 1998 (Maine Turnpike Authority)

**Measures of Growth, 2002.** Performance measures and benchmarks to achieve Maine's long-term economic goals. This, the eighth report of the Maine Economic Growth Council, details 60 performance measures in three categories that the Maine Economic Growth Council sees as necessary for achieving long-term economic growth in the state. Each performance measure has a benchmark or a target of where we would like to be at a specific time in the future, an explanatory paragraph, and a graph. The Growth Council is administered by the Maine Development Foundation, an independent non-profit, economic development corporation created by the legislature in 1978. (Maine Development Foundation)

**Six-Year Transportation Plan.** The concept of a Six-Year Plan was developed in response to a need to provide a better linkage between the Department's 20-Year Transportation Plan, which is policy based, and its Biennial Transportation Improvement Program (BTIP), which is project based. This plan provides a view of project priorities beyond the traditional two-year period. The expanded vision provided by this six-year planning document provides the Department with the opportunity for more effective management of its planning, project development, and financial resources. As importantly, it enables communities to plan for their own multi-year capital improvement projects and heightens their awareness of how their transportation needs may be addressed in the near future. Nearly all projects considered in the development and preparation of the BTIP are drawn from the Six-Year Plan. This plan is updated every two years to reflect changing needs and priorities. Last revised 2001. (Department of Transportation)

**State of the System Report.** The purpose of this report is to objectively assess the condition, report on the use of, and identify the present and future needs of Maine's transportation system. This report is a precursor to MaineDOT's 20 Year Transportation Plan and it provides data-supported historical trends and future predictions essential for long-term planning. In short, the State of the System Report is MaineDOT's strategic planning analysis for Maine's transportation system and the physical infrastructure that supports the movement of Maine's people and goods. 2002 (Department of Transportation)

## Appendix C - Related Documents (continued)

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***A Summary of the Findings of Studies Regarding a Maine East-West Highway.*** Prepared by the Maine Department of Transportation and Maine State Planning Office, September 1999. This report presents a summary of findings from the following study documents:

*A Technical Report On An East-West Highway in Maine*, Maine Department of Transportation, September 1999.

*Maine East-West Highway: Assessment of Toll Financing Feasibility*, Wilbur Smith Associates, September 1999.

*Maine East-West Highway Economic Impact Analysis, Phase I Technical Report, Baseline Conditions*, RKG Associates, Inc., June 1999.

*Maine East-West Highway Economic Impact Analysis, Phase II Technical Report, Survey Research and Commodity Forecasts*, RKG Associates, Inc., July 1999.

*Maine East-West Highway Economic Impact Analysis, Phase III Technical Report, Economic Impacts*, RKG Associates, Inc., September 1999.

*Maine East-West Highway Economic Impact Analysis, Phase IV Technical Report, Case Study Analysis and Real Estate Impacts*, RKG Associates, Inc., September 1999.

***Twenty-Year Transportation Plan.*** Several changes in state and federal transportation planning and policy have taken place in recent years. Two of the most significant events contributing to this change occurred in 1991. At the federal level, landmark legislation known as the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), established a new vision for surface transportation in America and significantly changed the direction of national and state transportation policy. At the state level, through a 1991 voter referendum, Maine's Sensible Transportation Policy Act (STPA) was enacted. STPA and the rule that was developed to implement it created a planning process that has significant public involvement and gives proper consideration to the diverse transportation needs of the people of the state, transportation efficiency, energy conservation, and the effects of transportation on the environment. In 1995, the MaineDOT developed a long-range planning document to be consistent with the goals and requirements of these important new transportation policies. This document was called the Statewide Twenty-Year Transportation Plan. This plan is updated every three years, with the most recent update occurring in 2000. (Department of Transportation)

***You Can Get There From Here Volumes I & II.*** Bicycle and Pedestrian Plans designed to promote non-motorized travel in Maine. 1995 (Office of Passenger Transportation and Maine Bicycle Council)

## **Appendix D - Feedback Form**

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**The Maine Department of Transportation invites your comments. Please mail or fax this form to the address below.**

1. General comments about this report:

2. How could the report be improved? What changes should we make?

3. Are there specific actions that should be taken as a result of some of the findings in this report?

4. If you would like someone to contact you, please provide your name and contact information:

**Return to:**

Rick Dubois, Director, Systems Management Division, Maine Department of Transportation, 16  
State House Station Augusta, ME 04333-0016 Fax: 207-624-3301



**The mission of the Systems Management Division is to analyze and report the condition and performance of Maine's transportation system and recommend optimal transportation investments to guide decision makers.**

### **Principles:**

- **Protect public safety**
- **Promote economic health**
- **Maximize benefits from available resources**
- **Be proactive, objective, and systematic**
- **Respond to customer needs**

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